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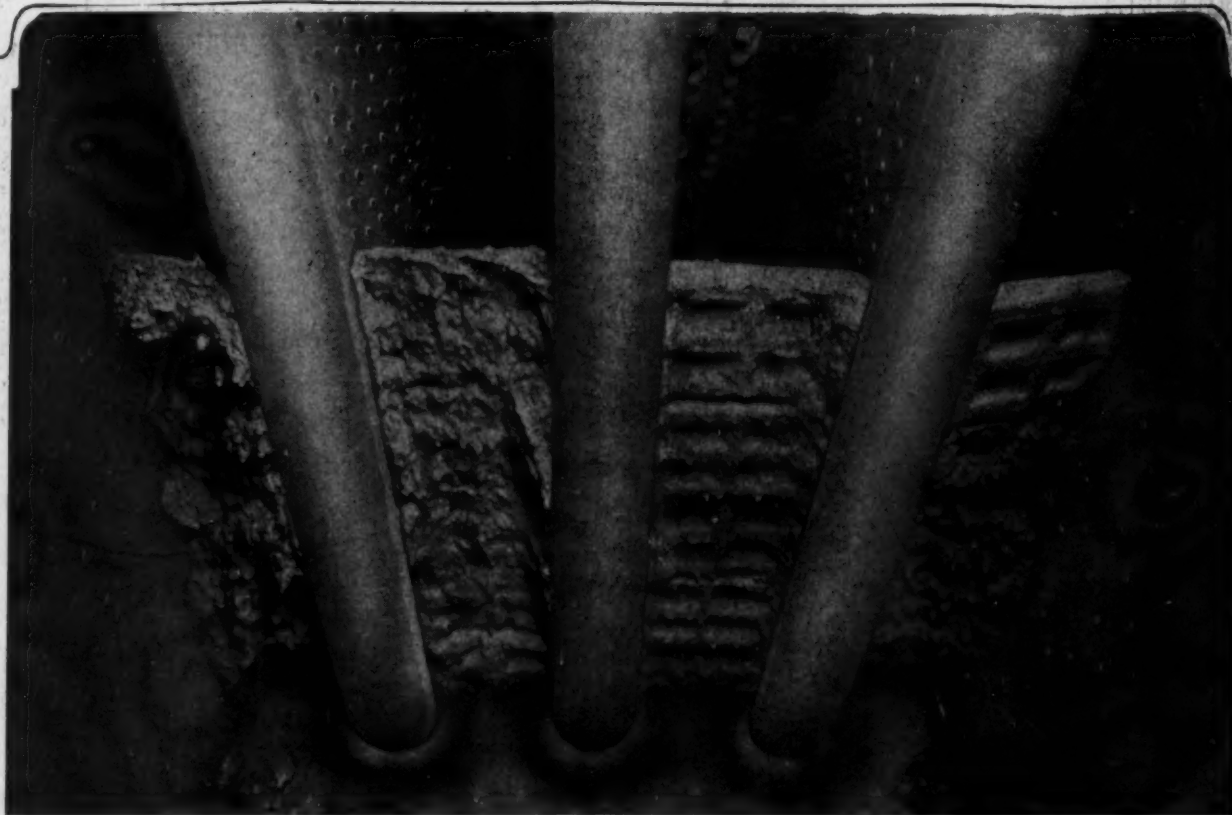
Railway Age

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SIXTY-NINTH YEAR

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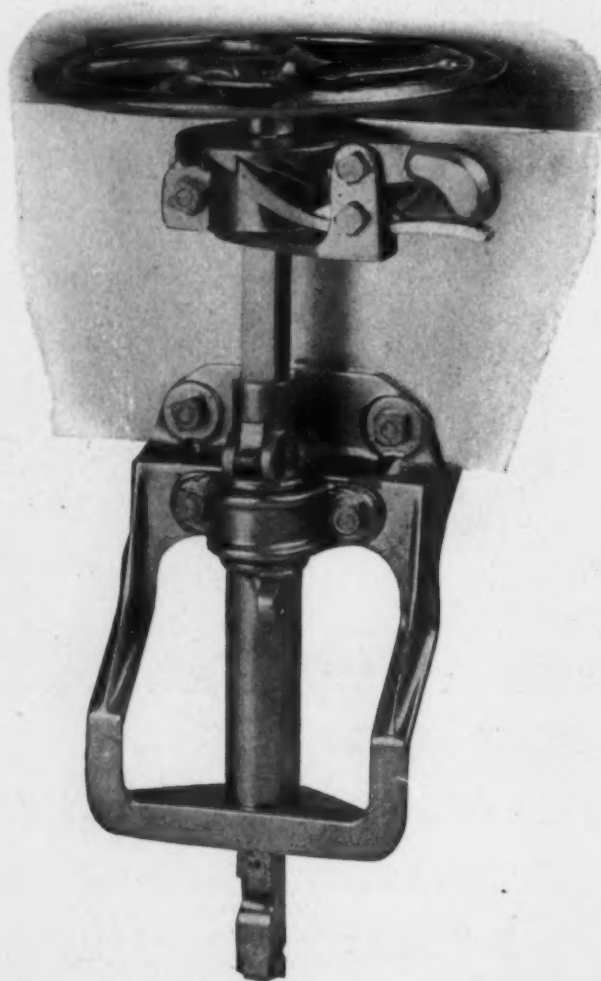
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EDITORIAL

Railway Age

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"The customer is always right." This rule for employees, said to be in force in certain large hotels, where it has become a habit of thought, has been adopted by a certain railroad president, according to an editorial in the New York Tribune; and the Tribune thinks that the president is not very practical.

To Appease Grouchy Patrons Without Joking

"The complaining passenger is quite as likely to be wrong as the conductor who gruffly dismisses his grievance. If the conductor is going to commiserate every dissatisfied passenger he would have to talk in this fashion: 'I know there ought to be another car on this train, and, of course, it's my fault. I'm to blame for our being a minute late every other day. They took off the 5:28 because I told them to. I opened the drawbridge on purpose to delay you. Yes, I know that this is the worst run road in the United States, but thank you kindly for reminding me of it. . . . Traveling is a great school of patience. On the whole, the trainmen carry no more chips on their shoulders than the travelers.' It will be pleasing to many trainmen to see that a great newspaper is sympathetic with them; but trainmen and the Tribune writer are alike in that they frequently exaggerate; and we venture to remind the trainmen not to spend too much thought on this attempt to help them. Extreme views are likely never to get anywhere. The trainman who wishes to make profitable use of the Tribune's suggestions will do well to sit down and rewrite the editorial, in his own language, substituting for these humorous phrases the appropriate sentences with which he might hope *really to mollify* a complaining passenger. That would be very useful mental exercise. Jokes are good at times, but not always easy to get away with. One good way for a superintendent to justify before the public "the taking off of the 5:28 train" would be to offer prizes to passenger-train employees for the best form (or forms) of words with which to meet dissatisfied passengers. When we are tempted to tell the passenger that he is as bad as we are, it requires actual and diligent study to be able to silence that thought and to say something pleasant.

On another page of this issue there will be found an interesting study of the fluctuations in the number of clerks employed

The Number of Clerks

by the railroads. This study has been prepared by the Bureau of Statistics of the Interstate Commerce Commission. It is a statistical analysis and apparently is not intended in any way to be controversial. There has been a great deal of discussion during the past two or three years concerning the number of clerks in railway employ. The rather substantial increase in the number of such employees has been made the text in particular of one argument to the effect that commission and government requirements for railway statistical reports have expanded beyond reason and are proving an undue burden upon railway operation. This issue was officially taken up by the Railway Accounting Officers Association. That body admitted that there were various cases of reports required by governmental authority that were burdensome. It also pointed out distinctly that the increase in the number of clerks was even more largely due, however, to the increased

complexity of the railway organization, to the need for more elaborate statistics for purposes of management, to more elaborate timekeeping resulting from more complicated wage schedules, etc. It also noted that increase in the number of clerks followed the establishment of the eight hour day for the clerical forces. With reference to the more recent period, it pointed to the additional accounting resulting from the federal control and guaranty periods and the winding up of the government accounts. The study now made by the Bureau of Statistics quotes these conclusions and appears to believe that they are borne out by the figures. It adds an additional contribution, however, when it points out that the number of clerks per ten million ton-miles today is no greater than it was 20 or 30 years ago. It says, to be sure that the number of clerical employees forms a larger proportion of the total number of employees than in earlier years but thereupon it refers to the reports of the Census which indicate this to be true of many industries. The study can hardly be said to be exhaustive. That it does not attempt to be entirely conclusive is shown by the recommendation for further study of the situation. It does, however, bear out the conclusions of the Accounting Officers Association and will, therefore, give those conclusions added authority and standing.

There has been considerable discussion of late of the progressively increasing ratio of maintenance of equipment ex-

Mechanical Department Statistics

penses to other operating expenses. Several factors have been suggested as being responsible. The one most frequently mentioned is the increase in size and in the number of appurtenances which characterize the modern locomotive. It is significant, however, that no one has offered anything but an expression of opinion as to just what weight should be given to this factor in relation to others, such as lack of adequate facilities, for instance, which undoubtedly are in part responsible for the present situation. In an article by J. E. Slater, special assistant to the general manager of the New Haven, published in the *Railway Age* of May 24, 1924, under the title, "The Problem of Mechanical Statistics," the concluding part of which article appears in the present issue, the suggestion has been made that one of the principal causes for the failure to explain the situation is the lack of adequate mechanical statistics or indeed, of adequate mechanical department accounting. One of the troubles with the classification of railway operating expenses in its present form is that it fails to offer readily available information for adequate analysis of mechanical department activity. It has been suggested that we need a division of cost of equipment repairs by major classes of power, a clearer division between shop repairs and enginehouse repairs and in general a more detailed analysis of the cost of equipment repairs. The present accounting classification offers no adequate material for such analysis and the classifications now under consideration contain no suggestions for improvement in the future. The Interstate Commerce Commission, under the terms of the Transportation Act, is given certain responsibilities as to the efficiency and economy of railway operation. With present accounts and statistics, one can readily tell whether a road is headed

for bankruptcy or likely to remain solvent. One may, if one delves far enough and has adequate knowledge of the road's particular conditions, form an opinion as to whether wise or unwise management is indicated. The mechanical department, however, offers an exception to the more general situation. With such data as is at present available, it is difficult, if not impossible, not only for an outsider but also for the railway officers themselves, to arrive at any conclusions as to the efficiency of this particular department.

The fact that the proposed revisions of the accounting classification offer no solution whatever of this problem is, in fact, one of the several reasons that the *Railway Age* has failed to be impressed by the work that the Bureau of Accounts and the accounting officers have done in connection with the accounts revision. It is, in truth, becoming more and more an open question as to whether the railroads and the commission alike are not finally going to find necessary some form of cost accounting in the mechanical department. The difficulty under present conditions is that the basic data for investigation or current control is so compiled that an analysis of the fundamentally different operations of the mechanical department is almost impossible without pursuing the investigation from the original sources up. If the cost accounting plan is impossible—and there are many who will argue that it is—it follows that the present departmental accounting system should be made sufficiently flexible to permit intelligent analysis of the individual accounts.

Adequate Facilities for the Care of Equipment

THE ACCOUNT of the reconstruction and enlargement of the Grand Rapids shops of the Pere Marquette, which appears on another page of this issue, presents a remarkable illustration of the rapid obsolescence of such facilities. As stated at the outset of this article, this plant had become so antiquated and inadequate within 20 years after its construction as to require almost entire rebuilding of the principal unit, the locomotive repair shop. It is because of this condition that the railroads are compelled to carry on practically continuous programs for the enlargement and replacement of facilities for the repair and care of locomotives and cars from year to year. It is a job that can never be completed.

Improvements in repair facilities have never kept abreast with the acquisition of new equipment. This situation reached a crisis during the severe winter of 1917-18 when, it will be recalled, it was largely the lack of adequate engine terminal capacity which caused the breakdown of the transportation machine in the face of the enormous war traffic. Recognizing this situation, the railroad administration approved the recommendation of the railroads for enormous expenditures for locomotive terminal improvements and large outlays for shop facilities. However, these addition and betterments, notwithstanding their magnitude, were no more than sufficient to take care of current requirements and, having been authorized under war conditions, were designed primarily to provide increased capacity rather than to effect economies of operation. But, as has been pointed out repeatedly in these columns, however much the first requirement has to be met, the second must also receive attention if the railroads are to fulfill the obligation to operate their properties efficiently.

Because the question of capacity is encountered in its most intense form in the engine terminal, the railroads have probably given greater attention to the improvement and enlargement of these facilities than they have to expenditures for repair shops. The inadequacy of a roundhouse with stalls

and turntable too short for the power handled or with an insufficient number of stalls becomes an obvious obstacle to the expeditious movement of traffic. It is true that the replacement of the turntable and the lengthening of the stalls in the old house or the adding of additional stalls will not produce a modern roundhouse with effective natural and artificial lighting, proper heating and ventilation, adequate approach trackage and modern facilities for coaling, inspection or the disposal of cinders. But it often happens that conditions calling for an increase in the capacity of an engine terminal result in its entire reconstruction so that the secondary consideration, namely, increased economy of operation, is obtained as a by-product. On the other hand, it is a fact that some railroads which have been compelled to make large additions to their engine terminal facilities are still carrying on their repair work with antiquated equipment in shop buildings 30 to 40 years old.

On the whole, however, the railroads are making encouraging progress in the development of modern repair shop facilities which not only insure adequate capacity but also provide for the economical conduct of the work. Recent issues of the *Railway Age* have contained a number of articles describing modern repair plants. These have covered such complete new layouts as the Burlington shops at Denver; reconstruction projects such as the Grand Rapids shops of the Pere Marquette, described in this issue, and general improvement programs covering a number of locations as in the case of the Denver & Rio Grande Western. Modern plants designed for the repair and reconstruction of steel cars have also entailed large investments, as in the case of the shop of the Elgin, Joliet & Eastern at Joliet, and the new shops of the Pennsylvania at Enola and Pitcairn. These examples, together with numerous others, of projects which the railroads already have under way or have completed, together with the announcement of projects in contemplation, indicate that the managements of the railroads are fully alive to the need of facilities designed for greater economy in the maintenance of equipment. However, it will require much larger expenditures than those already authorized to meet the needs of the present, without taking into consideration the requirements of the future growth in business.

Railways Increase Economy of Operation

THE RECENT SLUMP in railway traffic has been much greater than most persons realize—so great, in fact, that the roads have been saved from very serious declines in the net operating income earned by them only by the great increases in the efficiency and economy of operation their managements have effected within the last two years. Even in spite of the large economies that have been made, the decline in net in April was so large that it put the total net earned in the first four months of this year below that of the first four months of last year; and the net earned in May also undoubtedly was much less than last year.

The fact is, that 1924 has thus far been a bizarre year for the railways—one of violent fluctuations of traffic and correspondingly violent fluctuations of gross and net earnings. In these respects it has presented the strongest possible contrast to 1923. In January there was a sharp decline of traffic and earnings. Then came February with an increase in traffic and earnings that made it the best February in all history. Both total earnings and net operating income were some \$30,000,000 greater than ever before. Then along came March and wiped out part of the gains that had been made in February followed by April with such a big decline of traffic that when it ended total earnings in the first one-

third of the year were \$80,500,000 less than in 1923, and net operating income was only \$264,732,400, as compared with \$268,212,000 in the corresponding part of 1923. When May reports are in it will be found that in the first five months of the year the net return fell pretty far behind that of 1923.

Because of the marked economies in operation that have been effected the net return earned during the rest of the year will show an increase if freight business, and especially coal shipments, recover from the recent slump. Operating expenses in the first one-third of the year averaged almost \$20,000,000 a month less than in the first one-third of last year. Some of this saving was due to retrenchments prompted by the decline of traffic, but most of it was due to the steady increase in efficiency of operation that has been going on and to the continuing removal of the effects of the shop employees' strike. This is shown by statistics regarding certain unit costs of operation that are compiled and published by the Interstate Commerce Commission. These statistics give the cost of locomotive repairs, engine house expenses, the wages of enginemen and trainmen, the cost of fuel and other locomotive and train expenses for each 1,000 gross tons of freight trains and the freight carried by them that are moved one mile. These unit costs in the first three months of 1920 averaged \$1.363 per 1,000 gross ton-miles. In the first third of 1921 they increased to \$1.522. In 1922 they were reduced to \$1.1143. Then came the coal strike, which increased the cost of coal, and the shop employees' strike, which increased most other railway expenses, and in the first one-third of 1923 these costs advanced to \$1.312. In the first one-third of 1924 they were again reduced to \$1.117. This was almost 15 per cent less than in 1923, and slightly less than in 1922. It was 27 per cent less than in 1921 and 18 per cent less than in 1920. Incidentally, it was 21 per cent less than in January and February, 1920, the last two months of government operation.

These and other facts that could be cited show that the economy of operation is being steadily increased, and it will continue to be increased if the politicians will give the railway managers a chance. The only way to make immediately practicable a substantial reduction of rates is by a reduction of wages. A slower but equally sure way is to so regulate the railways as to enable their managements to effect operating economies by the investment of capital in improvements and by the working out and adoption of improved methods of operation. The most curious feature of the railway situation is that it is from those who are most persistent in demanding reductions of rates that the railway managers meet the most determined opposition to all their efforts to make practicable reductions of rates by either of these methods.

Looking Ahead

GREAT EFFORTS have been made for four years to inform the public regarding the true purpose and effect of the provisions of the Transportation Act and to convince it that, in the main, this law is sound and should be given a thorough trial for a period of years. These efforts have met with a large measure of success. Some of the principal obstacles to their success have been created by things done by some of the railways themselves. The widely prevalent human desire to both eat one's cake and keep it, is occasionally manifested even in the railway business.

The railways have opposed repeal of the rate making provisions of the Transportation Act. At the very time they were doing so, however, a group of them sought to have the courts set aside as unconstitutional the "recapture" clause of these provisions. This was inconsistent, and it seems

highly probable that if the courts had invalidated the "recapture" clause, the rate making provisions as a whole would have been repealed.

The railways have opposed repeal of the labor provisions of the act, and especially the substitution for them of the Howell-Barkley Bill. Generally speaking, the railways have complied with the labor provisions and have obeyed orders of the Railroad Labor Board, but there have been enough exceptions to this policy to give the critics of the railways and the enemies of the labor provisions ammunition which they have used against both the railways and the labor provisions with much force.

A great victory for sane regulation of railways was won when Congress adjourned without passing any railway legislation, but both the railways and the Transportation Act are still on trial. The outcome will depend not only upon the skill and energy with which they are defended, but even more largely upon the way the railways conduct themselves. The situation demands that the railways, as long as they continue to defend the provisions of the Transportation Act, shall scrupulously conform to their letter and spirit. They ask that labor and the Interstate Commerce Commission shall do this. As long as they ask this of labor and the Interstate Commerce Commission they cannot consistently or safely do otherwise themselves. The future of the railways depends upon public sentiment. Public sentiment will depend more upon what the managements of the railways do than upon what is said about them. Unfortunately, not a few railways have done things since the Transportation Act was passed that were not consistent with the general policy of the railways in opposing important changes in that law.

One thing which is becoming clearly apparent is that the radicals are shifting from attacks upon the policy of regulation embodied in the Transportation Act, to attacks upon the entire policy of private ownership and public regulation. After having for some years carried on propaganda which was intended to discredit private management and public regulation for the purpose of paving the way to government ownership, they have now begun openly and vigorously to advocate government ownership itself. They will use their failure to get "relief" for labor through the Howell-Barkley bill, and their failure to get "relief" for the farmers through numerous bills for reductions of rates introduced during the recent session of Congress, as arguments to show that neither labor nor the farmers can get fair treatment under private ownership and that government ownership is the only panacea.

There can be no doubt that the prevalent sentiment of the nation is opposed to government ownership, but public sentiment can change. There are two ways in which private ownership can be effectively defended. One of these is by the managements of the railways, giving the most scrupulous conformity to existing laws, operating with the greatest practicable efficiency and economy, and granting reductions of rates wherever and whenever they become reasonable and practicable. The other is to continue to meet attacks upon private management by the widespread presentation to the public of pertinent and convincing facts and arguments.

It is encouraging to realize that Congress has adjourned without passing any railway legislation. It will be discouraging to some to realize that the attacks upon the railways will not cease and that the campaign of education in their behalf will have to be continued. But why should this cause discouragement? The railway managements know that there will always be legal questions and litigation and they continuously maintain legal departments to deal with them. There is no more reason for discouragement because it is necessary to continue to wrestle with problems of public relations than there would be for discouragement because it is necessary to continue to wrestle with legal problems. The time will never come during the life of any man who is

now a railway officer when it will not be necessary for the railways to carry on extensive activities to influence public opinion regarding their business, and the managements had best reconcile themselves to this fact and proceed accordingly.

An Early Start Saves Money

IN A MEMORANDUM issued by the Baltimore & Ohio with its report of earnings and expenses for April, the statement is made that the road has extended its practice of applying rail in the early months of the year with regular forces instead of throughout the year with special "rail gangs" with the result that over 70 per cent of its year's program was completed during the first four months. A recent check of the tie renewal program of another large road indicated that approximately three-quarters of all of its tie renewals had been made prior to June 1. That these are not isolated experiences but are indicative of a trend in the redistribution of maintenance of way work throughout the country is indicated by the fact that the Class I roads of the United States as a whole expended over \$10,500,000 or 7 per cent more for maintenance of way and structures in the first three months of this year than during the same period in 1923. Since weather conditions were no more adverse and in most cases were more favorable this year than in 1923, this increase in expenditures may fairly be attributed to the performance of a larger amount of work.

This is a highly gratifying condition which promises much in the way of more economical maintenance. It is the logical readjustment of the season's working program which was made possible by the change of the fiscal year from June 30 to December 31, authorized in 1916 by the Interstate Commerce Commission. Prior to this change it was the almost universal practice of the railways to postpone the inauguration of their improvement programs until after July 1 in order to improve the showings of the year then drawing to a close and to transfer the heavier expenditures into the next year. Although the fiscal year was changed eight years ago, the disorganization incident to the world war and the multitude of other problems which have confronted railway managements since that time have so monopolized their attention that it is only within the last year or two that the more progressive roads have broken away from their old habits in this respect and are now realizing the benefits of the longer working season.

The inauguration of the year's maintenance program at the earliest possible date is conducive to economy for a number of reasons. In the first place, as indicated in the Baltimore & Ohio statement, it makes possible the more productive utilization of those maintenance forces which are retained throughout the winter. By distributing the materials in ample season they are made available for installation by the forces as opportunity offers through the winter, with the result that a surprisingly large part of the work can be done by the forces which would otherwise be engaged to a large extent in "chasing snowflakes." Furthermore, the completion of a large part of the season's heavier renewals before the opening of what has previously been considered the working season reduces the amount of work to be done during the summer and makes possible the maintenance of a more uniform force, which in turn decreases the turnover and adds greatly to the efficiency of the men by reason of their increased experience. Another advantage of no small proportions is the fact that a large part of the work can be completed during the early spring months when working conditions are more favorable than during the more intense heat of July and August.

There is another phase of this problem which should not be lost sight of, particularly by those railway supply com-

panies and others who are inclined to look on present conditions with more or less pessimism. Numerous comments are now heard regarding the retrenchment of the railways, as evidenced by the decline in the volume of purchases and by the failure to put on large maintenance forces and, in some instances, by the tendency to curtail them. In weighing these conditions one must bear in mind the fact that the purchases which were formerly made in large volume at this season have now been made earlier and the materials have already been delivered and are in large part installed, making it unnecessary to add to the seasonal forces now and in some instances making it possible to effect the reduction in forces which was formerly done in the fall.

Maintenance of way officers have long contended that no factor contributed more to the cost of their work than its concentration within a few months. Now that the conditions that led to this concentration have been removed, it is gratifying to note the number of roads which are taking advantage of the new conditions to promote more economical maintenance. It is to be hoped that the results which they are securing will lead other roads to adopt the same practice until it becomes universal.

Books and Special Articles of Interest to Railroaders

(Compiled by Elizabeth Cullen, Reference Librarian, Bureau of Railway Economics, Washington, D. C.)

Books and Pamphlets

Arbitration Between Carriers and Employees—Boards of Adjustment. Report recommending amendments to Howell bill (S. 2646) and that "bill do pass" from Senate Committee on Interstate Commerce, June 6, 1924. 68th Cong., 1st sess. S. Rept. 779. 4 p. Published by Govt. Print. Off., Washington.

Digest of State Laws Relating to Taxation and Revenue 1922. Compiled by U. S. Bureau of the Census in connection with decennial report of wealth, debt, and taxation. 544 p. Published by Govt. Print. Off., Washington. \$1.00.

Guide to Rhodesia. 2d ed. History, description and traveling facilities of the railways. p. 59, 72, 356-423. Illustrated. 432 p. Published by Beira & Mashonaland and Rhodesia Railways, Bulawayo, Rhodesia. Two shillings, sixpence.

Payment By Results; Introduction, Organization, Rate-Fixing, by James E. Powell. Wage scales based on work accomplished. 411 p. Published by Longmans, Green & Co., New York. \$7.00.

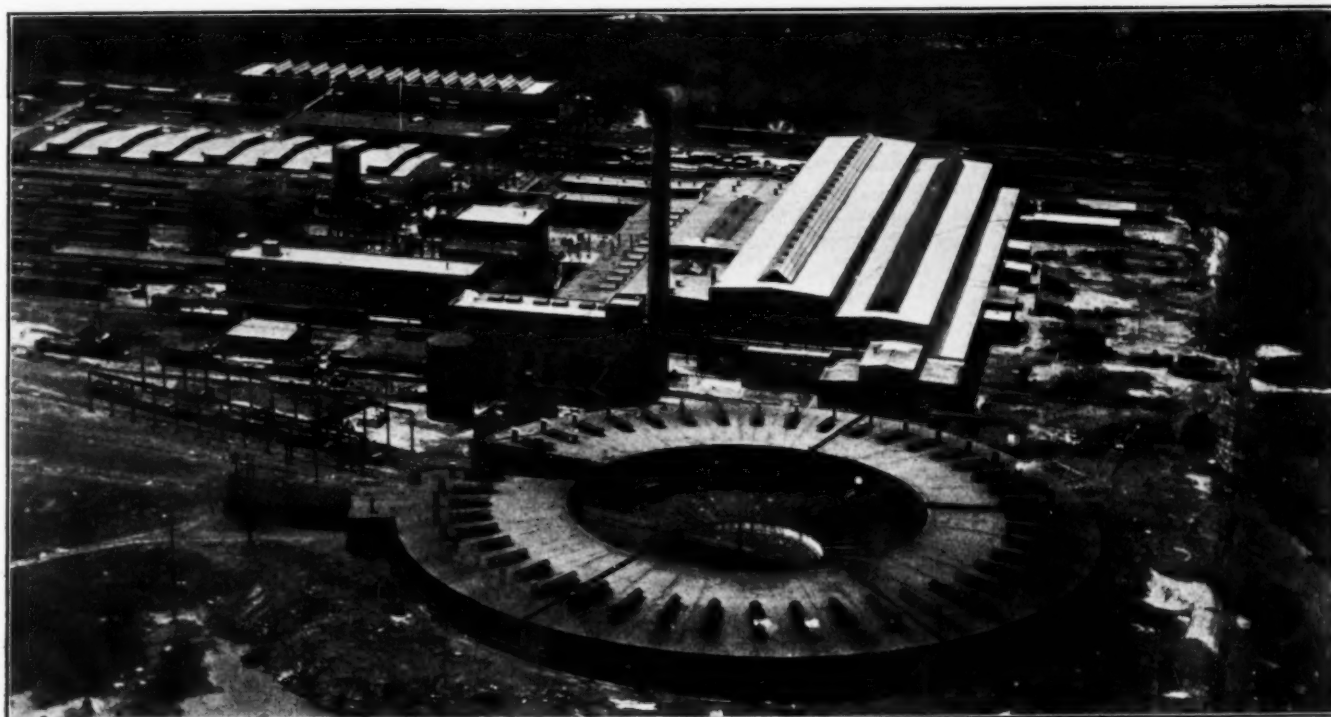
The Show-Off: a Transcript of Life in Three Acts, by George Kelly. The Pennsylvania Railroad is used regardless to aid a cocky "hero" in this play. 129 p. Published by Little, Brown & Co., Boston, Mass. \$1.75.

Transportation Rates of Common Carriers. Hearings on bills for repeal of or amendment of Section 15a, Transportation Act of 1920, before Senate Committee on Interstate Commerce, April 9-May 5, 1924. 818 p. Published by Govt. Print. Off., Washington.

Periodical Articles

How Railroad Securities Measure Up Under the Magazine of Wall Street's "Adjustable Rating System," by Jackson Martindell. Magazine of Wall Street, June 7, 1924. p. 178-183.

The St. Lawrence River and Hudson Bay Projects. Papers on the economic aspects and present status of the Hudson Bay Railway, including maps, and estimated costs of operation, and on St. Lawrence waterway, by W. Nelson Smith, L. C. Nesham, J. L. Busfield; and J. G. Sullivan. Engineering Journal (Canada), June, 1924, p. 269-290.

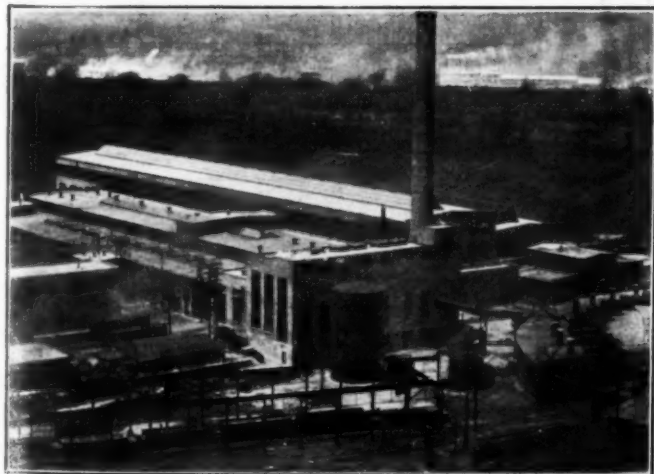


An Airplane View of the Plant

How the Grand Rapids Shops Were Modernized

Reconstruction of Pere Marquette Plant Involved Only
Minor Departures from Original Layout

THE COMPLETE RECONSTRUCTION of the general repair shops of the Pere Marquette at Grand Rapids, Mich., comprises the most important feature of a project which the railroad has prosecuted during the past four years for the purpose of increasing its locomotive facilities greatly.



The New Shop and the Power House, Cinder Plant in the Foreground

In accordance with this plan, new engine terminals were constructed at New Buffalo, Mich., Plymouth and Saginaw, in 1921, while work is now nearing completion on a new enginehouse near the Fort street station at Detroit and on a complete new engine terminal at Erie, Mich., just north of Toledo.

The work at Grand Rapids is of particular note because it represents the fulfillment of a plan for the incorporation of several old structures in an existing plant in the development of a thoroughly modern shop with little modification of the general layout. It is also of interest that the Arnold Company, which planned the original layout at Grand Rapids in 1904, was retained to design and carry out the reconstruction.

The original development at Grand Rapids included a 24-stall rectangular enginehouse on one side of a transfer table 86 ft. wide, and a locomotive erecting, boiler and blacksmith shop on the other side. The fundamental objects in the planning of this layout were to produce a design which would provide first, the maximum facilities for the least cost, of construction and operation and, second, a degree of flexibility that would readily permit extensions when required. While it would be difficult, owing to a lack of comparative cost data on railroad shop construction and operation, to prove that the first object has been obtained it is believed that the second object was accomplished, since a considerable part of the original shops are still in use and, together with the additions which have been made from time to time, produce a very modern and economical shop and terminal arrangement.

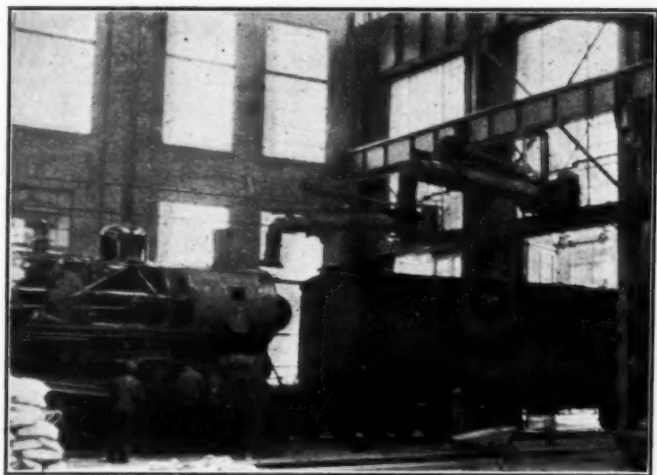
Successive Steps in the Enlargement

Subsequent to the original construction the plant has been subject to considerable development. In 1909, three bays were added at the west end of the locomotive and erecting shop, thus obtaining three more erecting pits, greater machine shop space and a larger planing mill department. In 1911 the present 43-stall circular enginehouse was built and the old rectangular enginehouse converted into a boiler and blacksmith shop. In 1917, a wood freight car repair shop was added.

In 1920, the Arnold Company was again commissioned to

make an analysis of the repair shops and as a result of this study plans were prepared for their reconstruction and a new general storehouse and warehouse was built in 1921, this latter building being necessitated by the destruction of the old storehouse by fire. However, the reconstruction work of the entire Grand Rapids shops was not actually begun until February, 1923.

The main and important changes which were made in 1923 are as follows: The old transfer table and also the first panel and crane bay of the boiler and blacksmith shop were removed and two new crane bays built to replace them. The old locomotive erecting shop was retained practically



Swinging Smoke Jacks Are Provided in the Shop for Firing Up Locomotives

complete, but the portion previously serving as an erecting shop is now used as a heavy machine tool bay, the pits having been removed where necessary for tool foundations and a new floor put in around the tools and over the old pits.

A new planing mill and car wheel shop was built and the blacksmith shop moved from the east end of the boiler shop and installed in the space vacated by the planing mill. A new steel freight car repair shop has been added as well as a yard crane runway which serves the storehouse, planing mill, wheel shop, steel and wood freight car shops, tracks and other contiguous departments.

The cinder pit facilities for the enginehouse have been remodeled, changing them from the inclined hoist type to an electric traveling crane with a clam shell bucket over two long pits. A new power plant, more suitably located in the reconstructed shop layout, has replaced the older power plant and the latter building has been converted into a paint and upholstery shop.

At the present time plans are being considered for an extension at the rear end of 22 stalls of the enginehouse to provide better facilities for the longer and larger engines now in use. When this improvement is carried out the shops and terminal will be sufficient to provide economically for the present requirements and for a reasonable increase in the immediate future. Further extensions of the various departments are possible, without destroying any existing valuable buildings or equipment.

Method of Handling Locomotive Repairs

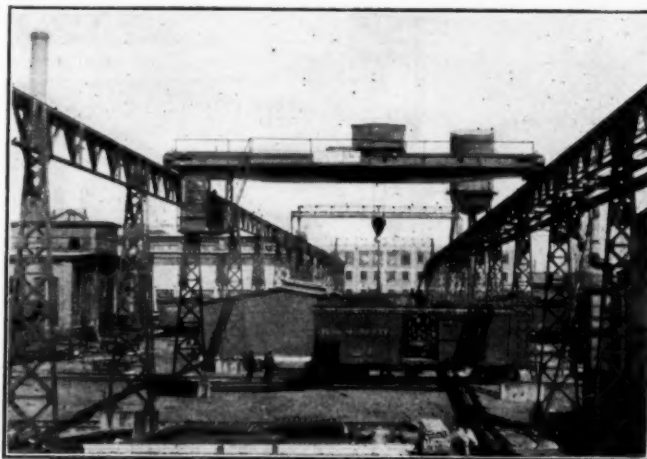
When a locomotive is scheduled for repairs at the Grand Rapids shops it is brought into the erecting shop on the first track at the west end of the building. It can there be un-wheeled and the boiler put on trucks and run under the crane bay of the boiler shop if the boiler is to undergo any repairs. If engine repairs only are required the locomotive can be hoisted with a 200-ton crane and transferred to any desired pit in the erecting bay. After repairs have been made and

the engine is again assembled it is transferred to the last track at the east end of the shop where it is fired up and given its preliminary trial. This end of the shop is provided with swinging smoke hoods which connect with a stack outside of the building.

The new locomotive shop houses, the erecting shop, machine shop, boiler shop, blacksmith shop and tin shop under one roof. The erecting shop has 24, 22-ft. bays, each of which is provided with a concrete pit 47 ft. long. The entire shop is served by a 75-ft. 200-ton crane with a 10-ton auxiliary hoist, operating on an upper level crane runway and by two 10-ton cranes, also having 75-ft. spans and operating on a lower level runway. The height of the erecting bay under the trusses is 54 ft. 6 in. and since this height is greater than that of the roof of the contiguous machine shop and boiler shop bays, it was possible to obtain excellent daylight and ventilation in the erecting bay by providing the walls above the adjoining roofs with steel sash of both the fixed and ventilating types. The latter have operators driven by electric motors which are operated from the erecting floor. Additional light and ventilation were secured with an A-shaped roof monitor extending over practically the full length of the building and composed almost entirely of glass. A ventilator was installed every 22 ft. in the peak of this monitor.

Both end walls are also largely of glass, brick being used only where required for strength and architectural appearance. The roof of the erecting bay is of 1¾-in. wood sheathing covered with a five-ply Barrett felt and tar-and-gravel roofing. The eaves of the roof are built up with a 3-in. by 8-in. vertical wood strip, properly flashed to form a gutter leading to Holt adjustable conductor heads. All drain spouts lead down inside of the building.

As previously mentioned the old erecting shop is now used as a heavy machine tool bay. The effect of this is practically to double the previous tool space and to provide 10-ton crane service over 60 per cent of the entire tool area. With the exception of a new floor in the old erecting bay and the



The Crane Way Is an Important Utility

removal of the wall and transfer table doors no structural changes were necessary in this shop.

The new boiler shop construction provides a 65-ft. crane bay, served throughout its entire length by an 80-ton and a 15-ton electric crane. In addition to this crane service there are 12, 1-ton jib cranes in the flue shop section. The boiler shop is the same length as the erecting shop and is separated from the latter only by the crane columns. The height of the crane bay under the trusses is 40 ft. 6 in., which permits the transfer of boilers by means of the crane from one track in the shop to any other. The roof construction and details are similar to those in the erecting shop. The new crane bay replaced the crane bay of the old boiler shop and also the bay

which faced the transfer table. The third bay of the old building was retained almost without change as was also 56 ft. of the east end of the building which has been converted from a blacksmith shop to a tin and pipe shop by changing the tool equipment.

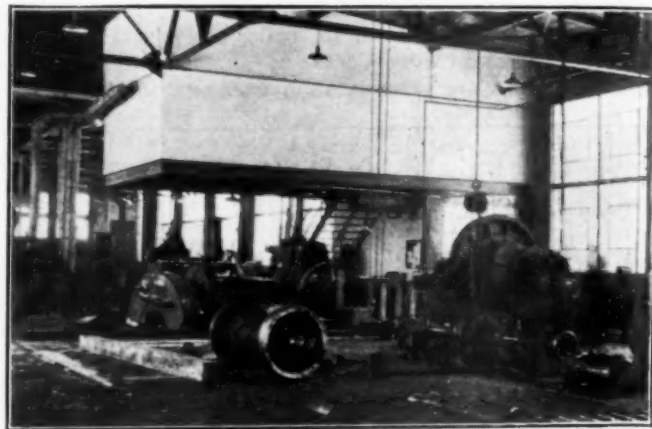
The new blacksmith shop now occupies the space vacated by the woodworking department, the result being a location very convenient to both the locomotive and car departments. New roof monitors were built over the blacksmith shop to provide the proper ventilation required by such a department. In addition to the construction of the main buildings of the locomotive repair departments as noted above, a number of small extensions and additions were made, these including the shop foreman's office, heating fan rooms, flue shop annex, flue storage building and blacksmith supply sheds.

Improve Arrangement of Car Repair Shops

The freight car repair facilities have been materially increased in capacity and considerably improved in arrangement. The original planing mill location was too far from the car repair tracks and lumber storage. Both of these objections are removed by placing the new mill adjacent to the wood car repair shop. In addition, ample room is provided for extensions when required.

The new planing mill and car wheel shop has a clear span of 65 ft. in width and is 215 ft. long inside and 18 ft. high under the trusses. The footings and also the walls to a height of 4 ft. above the floor line are concrete, the balance being brick and glass set in steel sash. The roof trusses are steel with the ends carried on the side-walls. Ten-inch steel channel purlines support the wood rafters and two-inch roof sheathing. The roofing is 5-ply "Mule-hide" felt and asphalt roofing, comprising not less than 80 lb. of felt and

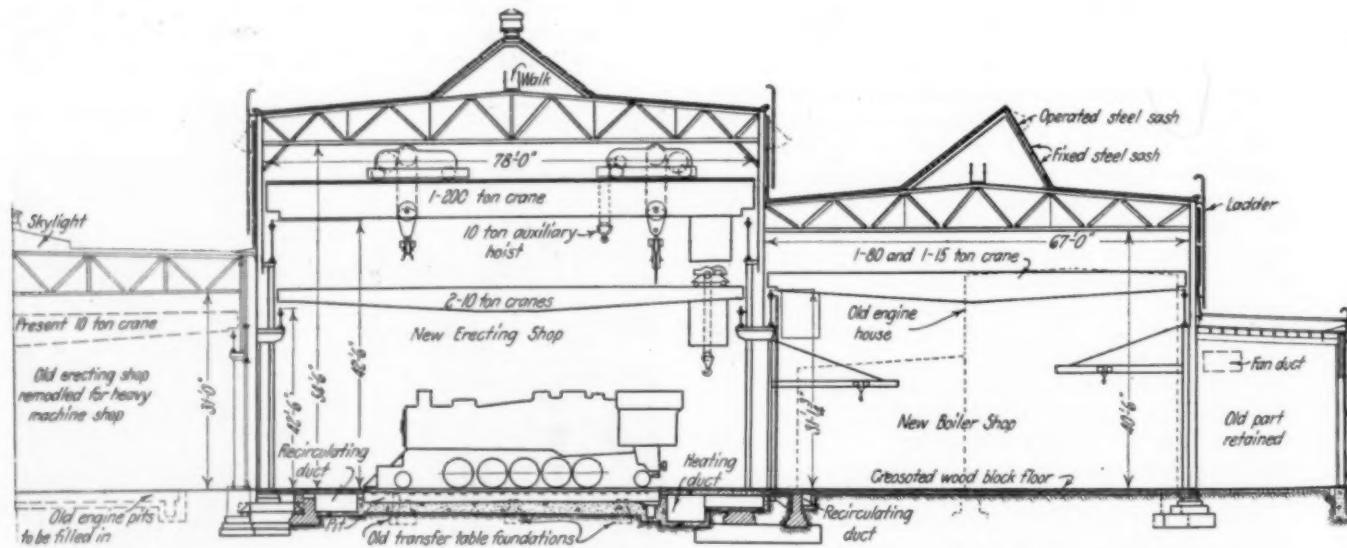
long inside and the entire area is served by two 15-ton electric traveling cranes having a 64 ft. 6 in. span. The clear height under the roof trusses is 31 ft. The wall construction is similar to that in the planing mill. The roof is 1 3/4-in. wood sheathing covered with five-ply Barrett felt and tar-and-gravel roofing. The floor of the shop is cinders, except in a small extension to the main building which houses the



A Part Interior View of the Car Wheel Shop

tool room, heating furnace and toilet facilities; this extension has a concrete floor with cement finish.

Two standard-gage repair tracks on 20-ft. centers extend through the building and connect with the yard tracks. A third track extends into the building for about two-thirds of its length, the balance of the space being devoted to tools.



The New Erecting Shop and Boiler Shop Were Built in the Space Formerly Occupied by the Old Transfer Table and Remodeled Engine House

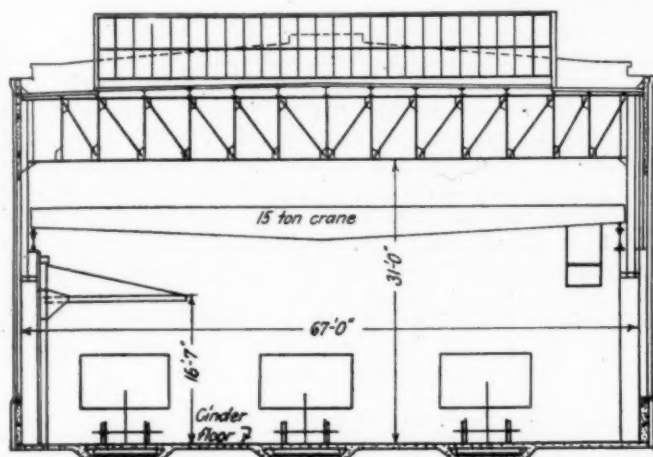
150 lb. of asphalt to 100 sq. ft. of completed roofing. All valleys and hips are reinforced with an extra ply of felt and asphalt. Both side and end walls have parapets and the roof drainage is carried down inside the building to wrought pipe downspouts. The sub-floor of both the planing mill and wheel shop departments is concrete on six inches of cinder fill. The planing mill portion has a cement finished surface while the wheel shop has a three-inch crosstied wood block pavement. A foreman's office and toilet, lavatory and locker facilities occupy a part of one of the center bays at the side, the new facilities being above the office and, therefore, not occupying valuable floor space.

The new steel car repair shop is 67 ft. wide by 320 ft.

Each crane column along one side of the building carries a 1 1/4-ton jib crane which swings out over the track and over an arc of approximately 180 deg.

The yard crane runway occupies a position midway between the locomotive repair shops and the car repair shops and terminates at one end over the storehouse platform. The runway is 804 ft. long and is equipped with a 15-ton electric traveling crane of 50-ft. span. In view of the area and the various departments which can be served with this crane it comprises one of the most important improvements in the reconstruction of the shops. The distance from the top of the yard rails to the top of the crane girder rails is 29 ft. 10 1/4 in.

The two new cinder pits for locomotive service at the enginehouse are 208 ft. long. They are located 30 ft. apart with a cinder car track midway between while overhead a 5-ton electric crane equipped with a 2 cu. yd. grab bucket spans all three tracks. The walls and bottom of the cinder pits are lined with 4-in. paving brick, the width inside the lining being 3 ft. 11 in. and the depth 4 ft. at the center and 4 ft. 4 in. at the ends. The bottom is protected against injury by the bucket by two inverted rails with their bases set $\frac{1}{2}$ in. above the concrete. Drainage is provided through a heavy cast iron grating at each end, covering sumps having a



Cross Section of the Steel Car Repair Shop

6-in. sewer connection. The tops of the pit walls are provided with 6-in. by 8-in. white oak blocks $19\frac{5}{8}$ in. long on 24-in. centers to support the rails.

A Well Lighted Power Plant

The power plant provides for all high pressure steam, compressed air and heating requirements of the shops and in addition receives and distributes all electric current needed for light and power. While there are no new or particularly unique features in the power plant layout, the design and equipment are modern and first-class and were selected to produce a reliable and economical plant, suited to the conditions existing in railroad shop operation.

Owing to the nature of the soil and to the fact that high river levels frequently occur, the main operating floor of the power house was placed 12 ft. 6 in. above grade, thus permitting a 12-ft. basement to be built entirely above the ground level. The effect of this design is to produce an unusually well lighted, clean looking interior, necessitating practically no artificial lighting during the day time and being free from the inconveniences of maintaining auxiliaries and piping in proper condition which is normally experienced when the basement is constructed below ground.

The boiler room is 45 ft. by 109 ft. 4 in. inside and has a height of 39 ft. 3 in. from the firing floor to the lower chord of the trusses. The coal handling system has a capacity of 40 tons per hour and consists of a concrete hopper (built below the coal receiving track immediately adjacent to the boiler room) a reciprocating plate feeder 27 in. wide, a 24-in. by 24-in. single roll crusher and a continuous steel-bucket elevator, equipped with a self-propelled automatic reversing tripper. All coal handling equipment is driven by motors which are controlled by push buttons and automatic starting switches, so arranged that each part of the equipment will be started and stopped in proper sequence.

The coal is received in drop bottom cars, crushed, elevated and then distributed by means of the belt conveyor and tripper to the bunkers over the firing aisle whence it is spouted through steel chutes to the stoker magazines. All coal

handling equipment was furnished by the Jeffrey Manufacturing Company.

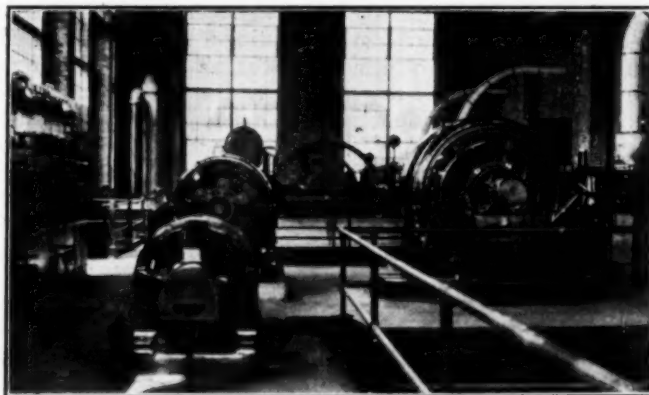
The ashes are raked out of fire brick-lined concrete hoppers under the stokers into one-yard, side-dump cars running on a 24-in. gage track. The cars are dumped into an ash skip hoist at one end of the boiler room basement, lifted and discharged into an overhead concrete hopper from which the cinders are dumped through steel chutes into cars on the coal track. The ash hoist equipment is of the automatic controlled, motor-driven type manufactured by the Ogle Construction Company.

The boiler equipment for the initial installation consists of four 508-hp. steel encased, vertical, water tube Wickes boilers. Sufficient space has been provided in the boiler room for an additional battery of two boilers whenever required. The boilers are operated at 150 lb. pressure.

Boiler Water Is Treated

The feed water equipment was furnished by the Cochran Engineering Company of Chicago, and is of the hot-process, lime and soda treatment type. This equipment consists of an open heater equipped with oil separator for the exhaust steam supply, a reaction and sedimentation tank, a pressure type filter, a chemical mixing tank and a chemical supply pump. The arrangement and capacity of the heater and softening equipment is such that it will heat and treat a maximum of 12,000 gal. of cold raw water per hour and heat 6,000 gal. of heating system condensate per hour, to a temperature of 210 deg. F. when supplied with the proper amount of steam. The character of the feed water available for the power plant is such that a considerable maintenance expense was found necessary in the old power plant but the preliminary operation of the new power plant with the softened water has demonstrated its advantages, as the boilers are now free from scale.

The boilers are provided with automatic stokers furnished by the Detroit Stoker Company and are of the inclined, side over-feed type with flat suspended arches. They operate with natural draft. Sufficient grate surface and draft has



In the Power House

been provided to enable the boilers to be operated easily with the usual grades of coal received, at 150 per cent of normal rating and at 200 per cent of normal rating for four-hour periods. The breeching is carried to a radial brick stack 11 ft. in diameter at the top and 200 ft. high, which was built by the Alphons Custodis Chimney Construction Company.

The pump equipment is located on the ground floor level immediately behind the boilers and is all open to view from the operating floor. It consists of two 14-in. by $8\frac{1}{2}$ -in. by 15-in. outside packed, pot-valve, duplex plunger pumps of the Worthington 300-lb. pattern, two 20-in. by 14-in. by 12-in. single cylinder heating system vacuum pumps furnished by

the American Steam Pump Company and a 20-in. by 14-in. by 12-in. duplex steam driven 1,500-gal. Underwriter's pattern fire pump furnished by the Union Steam Pump Company. Two Ingersoll-Rand duplex air, cross-compound steam, air compressors with a capacity of 3,000 cu. ft. per min., have been installed and space is provided for a third similar unit.

The present electric generator equipment includes two 150-kw., 250-volt direct current generators, one of which is driven by a steam engine and the other by a 440-volt, a.c. 3-phase, 30-cycle motor, both units being direct connected. A third unit consisting of a 50-kw. d.c.-a.c. machine is also installed for small lighting loads and emergency service. These units provide for the supply of direct current to the motors in the shops and in case of failure of the purchased supply current, the steam driven unit can be used for the lighting system.

The major portion of the electric current required is alternating current purchased from the Consumers Power Company. This is received from a 7,200-volt, 3-phase, 30-cycle transmission line and conducted to outdoor transformer banks, which consist of three 250-kv.a. 7,200:440-volt single-phase power transformers and three 75-kv.a. 7,200:230-volt, single-phase lighting transformers, supported upon a concrete platform immediately adjacent to the power plant building.

Heating System Embodies Both

Direct and Indirect Radiation

Low pressure steam heating systems with vacuum return lines are used for all the buildings. With the exception of very cold weather periods and nights, the steam is obtained from the power plant exhaust, but when this is insufficient, live steam is automatically admitted at the power house through a pressure reducing valve.

The locomotive machine, erecting and boiler shops are heated almost entirely by hot air supplied by fan units discharging through a system of concrete underground and sheet-metal overhead ducts to sheet-iron outlets placed adjacent to the columns in the center of the shops and carried up high enough to discharge the air horizontally above the heads of the shop workers. Concrete re-circulating ducts have also been built under the floor which return the air to the fans from the interior portions of the building and insure uniform temperature. There are now five fan units, four of which are new. These units are of the American Sirroco type, each driven by a horizontal steam engine. The heater units are of the Vento cast iron sectional type. Direct radiation has been provided along the outside wall of the boiler shop and in the blacksmith shop and foreman's offices and the planing mill is heated entirely by direct radiation.

The steel car repair shop is heated about 75 per cent by indirect radiation and 25 per cent by direct radiation. There are two indirect Sturtevant unit heaters at each end of the building. The air is drawn from the shop at about 20 ft. from the floor by a motor-driven, propeller-type fan at the top of the unit and is discharged into the shop horizontally from an elbow at the bottom of the fan at about 10 ft. from the floor.

The re-location of the power plant, together with the changes and additions in the shop buildings, necessitated a re-design of the main supply pipes for heating, high pressure steam and compressed air service. In the old layout some pipe tunnels were used for the distribution mains, but with the new arrangement calling for much larger lines, the cost of tunnels giving proper space for inspection and repair would have been excessive. An additional objection to tunnels was the possibility of these being flooded during periods of high river levels. For these reasons all pipe mains, except heating returns, are run overhead, or suspended from trusses and walls when inside. The heating returns in gen-

eral are in concrete trenches with removable covers when inside of buildings and in wood logs when outside in the ground.

Electric Light and Power Systems

The extensive additions and alterations to the shops necessitated the entire reconstruction of the electrical distribution system to the various buildings and plant units. Prior to the reconstruction period the greater portion of the electrical energy consumed was generated at 230 volts direct current and distributed to the various buildings at that potential while the lighting was distributed by means of a three-wire system at a potential of 115:230 volts. With the advent of the new shop buildings and the increased power loads greater distances of transmission than heretofore were introduced and as a result it was found necessary to raise the distribution voltage. Consequently a decision was made to change from direct current to 440-volt, 3-phase, 30-cycle alternating current for all of the new buildings. Direct current power was retained only in the enginehouse, blacksmith shop and the locomotive, machine and boiler shops for the operation of the tools already in place. All additional tools in these buildings were made 440-volt alternating current. The 230-volt direct current motors originally in the machine and boiler shops, enginehouse and blacksmith shops, were retained. In moving the tools from the old planing mill to the new planing mill all direct current motors were replaced by alternating current motors and, with one or two exceptions, all new tools in all buildings were supplied with alternating current motors, it being the intention ultimately to do away with all direct current applications. All new machine tools were supplied with automatic push button controllers with overload and undervoltage features.

An effort was made to secure adequate artificial lighting facilities in the various buildings. General illumination intensities were figured at a value which would make it unnecessary to use local illumination in the nature of portable lights in all but a very few cases. In general, steel porcelain enameled reflectors, furnished by The Central Electric Company, were used throughout. In the offices an attempt at refinement was made by the use of a more elaborate glass fixture.

An intensity of not less than six candle feet on the working plane was arrived at in all of the buildings erected. In some places this figure was slightly exceeded. On the whole the results obtained are highly satisfactory. In the erecting bay of the locomotive shop, for example, two 750-watt units were mounted on the center line of each bay 52 ft. above the working plane. In addition a 500-watt angle type reflector was mounted 22 ft. 6 in. above the floor on each column between the various bays making a total installation of 2,500 watts per bay or 1.6 watts per sq. ft. Receptacles of the "Ralco" type were installed on each column in the boiler shop and in each pit of the locomotive shop for portable lamps and small tools.

The design and reconstruction of the Grand Rapids shops have been handled under the general direction of H. A. Cassil, chief engineer of the Pere Marquette, and under the immediate supervision of Job Tuthill, assistant chief engineer. P. K. Ruckel was superintendent for the Arnold Company and R. J. Black was the railroad's representative on the work.

TWELVE THOUSAND DOLLARS is the sum which the National Automobile Chamber of Commerce proposes to spend this year in the promotion of the fourth annual national safety contest, the manager of which will be the Highway Education Board, Willard Bldg., Washington, D. C. Last year about one-half million children wrote essays on traffic safety, in competition for the prizes, and 60,000 teachers wrote lessons on the same subject.

Freight Claim Prevention Men Meet at Chicago

Representatives of Railroads and Shippers Discuss Ways of Reducing Losses from This Source

A FREIGHT CLAIM PREVENTION CONGRESS was held at Chicago on June 4 and 5 under the auspices of the Chicago Claim Conference to consider ways of reducing claims. It was attended by 500 representatives of railroads including men from points as remote as Galveston, Tex.; Boston, Mass.; New York, Winnipeg, Man., and New Orleans, La. Parks C. Archer, general claim agent of the Chicago & Alton, and chairman of the Chicago Claim Conference, presided. Attendance at the first day's meeting was confined to railroad representatives while the second day's meeting was also attended by a number of shippers and the program included addresses by several traffic managers of industries located in Chicago. The discussions which took place ironed out many grievances between the shippers and the railroads, and were summarized in resolutions which were approved by both the railroad representatives and the shippers present. They were in part as follows:

Resolutions Adopted

That an analysis be made of present practices and facilities, including the opening and closing hours of merchandise handling houses and platforms, to the end that more orderly methods under competent supervision and with adequate policing may prevail; That complete and prompt information as to all freight thefts be transmitted immediately by local freight agents or other interested employees jointly to the police department and the claim prevention bureau with prompt subsequent interchange of this information between the interested lines; That shippers who have co-operated in promoting the use of durable containers, better marking and packing be commended and that every possible effort be made to give impetus to the campaign for wire and box strapping which is being conducted during the month of June; That in the investigation of claims and the analysis of exception reports greater effort be made to determine the underlying claim causes and to avoid the indefinite classification "unlocated"; That individual lines represented in this Congress should inaugurate at once a plan of tabulating destination reports for all carload damages discovered with the view of determining the specific commodities involved and the apparent causes for such damage, such reports, when properly classified, to be sent promptly to the freight claim prevention officers of initial lines. In view of the fact that the larger number of such consignments are loaded by shippers it is also vital that reports of defects due to containers, improper loading, bracing, etc., directly chargeable to such loading, be called to the attention of shippers through proper channels.

It was also decided that copies of monthly summaries, referred to above, be sent to the Freight Claim Prevention Committee of the American Railway Association for further study and handling. Another resolution was to the effect that carriers take immediate steps to perfect their organizations (1) to insure the maintenance of perishable freight train schedules, give priority to this class of freight, and prevent delays, (2) by the adoption of standard distinctive waybills and other forms used in connection with the handling of this traffic, maintenance of adequate icing facilities properly spaced to avoid excessive lapses, and education of interested employees, reduce the hazard of inadequate refrigeration, improper ventilation or heating and the proper taking and recording of records, (3) to bring about a uniform system of inspecting fresh fruits and vegetables,

both at the point of shipment and destination, this to be accomplished by the employment of inspectors trained for that purpose by individual carriers, or by employees of regularly organized railroad or commercial inspection bureaus, who will investigate at the source all field diseases and inherent defects in commodities, develop the adequacy of containers and check packing, loading, stowing and bracing methods.

Another resolution advocated that district claim conferences and other railway organizations and individual carriers continue to give the Committee on Freight Claim Prevention of the American Railway Association their active co-operation and support; That district claim conferences and local freight agents' associations make more of a study of freight claim prevention practices of the roads comprising their membership, with the view to promoting greater uniformity, and bringing about a larger degree of co-operation among carriers and more of a co-ordination of prevention activities within their respective territories and that as a means to this end, claim conferences outline and encourage special campaigns and seasonable drives on individual lines with reference to causes and commodities, which in their opinion require special and uniform action, such as "No Rough Handling Month," "No Lost Package Month," and "Perishable Freight Month."

Addresses Made by Several

Railroad Men and Shippers

G. W. Lupton, assistant to the vice-president of the Atchison, Topeka & Santa Fe at Chicago, and J. H. Hustis, Jr., superintendent of property protection of the New York Central at New York, spoke on methods of conducting freight claim prevention activities. Abstracts of their papers appear below. F. L. Johnson, assistant to the vice-president in charge of operation of the Chicago, Burlington & Quincy at Chicago, spoke on carload damages. G. L. Comlossy, manager of the Merchants Dispatch of the New York Central at New York, and F. G. Fagen, superintendent of freight protection of the Southern Pacific at San Francisco, addressed the meeting on damage to fresh fruits and vegetables. F. L. Charles, assistant to the general freight claim agent of the Baltimore & Ohio at Cincinnati, spoke on less than carload loss and damage.

The second day's meeting was opened by an address by J. E. Gorman, president of the Chicago, Rock Island & Pacific, who recited many interesting experiences as a claim clerk. He was followed by George A. Blair, traffic manager of Wilson & Co., Chicago, who emphasized the fact that a shipper would much rather have his goods delivered in good condition and without shortage than to be reimbursed by a carrier for loss sustained and while a prompt settlement by a carrier partially makes up for such loss the dissatisfaction of the customer and probable loss of business cannot be calculated. He attributed the decreasing claims to (1) uniform improvement in service, and (2) the efforts to prevent claims in which shippers have contributed their share.

J. A. Brough, traffic manager of the Crane Company, Chicago, spoke on the reimbursement of shippers or consignees for expense incurred in reconditioning and disposing of damaged articles. H. R. Park, traffic manager of the Chicago Livestock Exchange, Chicago, spoke on the expedition of claim adjustment through proper presentation with supporting documents. Henry C. Kramer, traffic manager of

the Wolff Manufacturing Corp., Chicago, spoke on the basis of measure of damages, that is, origin or destination value. S. T. Heffner, traffic manager of J. V. Farwell Company, Chicago, spoke on concealed loss and C. T. Bradford, traffic manager of the International Harvester Company, Chicago, spoke on freight charges on damaged articles returned to shippers.

The Santa Fe Freight Claim Organization

G. W. Lupton described the Santa Fe system in part as follows:

Realizing the enormous drain on the company's treasury, the late President Ripley issued instructions in 1909 to the effect that an organization should be perfected looking toward a reduction in Account 418. Pursuant to these instructions representatives from the operating, traffic, accounting and claim departments assembled at Topeka, Kans., and launched an intensive campaign. The organization which has been perfected is as follows:

First, the agents at the larger stations are required to keep claim prevention constantly before employees under their supervision by holding meetings at frequent intervals with warehouse foremen, truckers, check clerks, receiving clerks, stowmen, bill clerks, switchmen, and others, while yardmasters at important stations and division points are required to supervise switching properly so as to minimize rough handling in yards. Switching inspectors are also utilized where the yardmaster's duties are such that he cannot cover the field.

Second—Good service meetings are held periodically on each division. The division superintendent presides and the various members of his staff are present, together with representatives from the traffic, claim and safety departments. Station, train, yard, and engine employees are invited to these meetings and a thorough discussion is had on all matters affecting the loss and damage account on that division. Third—Twice a year each general superintendent, or assistant general manager as we term this official, holds what is known as a grand division loss and damage meeting, over which he presides and which frequently extends over three days. Grand division, as well as division, officers of the various departments attend and each division superintendent designates certain employees under his jurisdiction, engaged in station, train, yard, and engine service, to attend these meetings, which of course, take on a wider scope than is possible at division meetings. Detailed performance statistics are presented and standing committees, similar to those functioning at the system meeting, submit their reports for discussion, acceptance or rejection. Each assistant general manager has a chief clerk in charge of over, short, and damage matters with the necessary clerical force, besides a corps of transportation inspectors, who devote all of their time to handling loss and damage matters and claim prevention work on their respective divisions.

Fourth—Formerly a system loss and damage meeting was held twice a year, but for the last three years these meetings have been held annually, as our experience leads us to believe that division meetings, semi-annual grand division meetings, and one system meeting a year suffice. The chairman of the system meeting is the assistant to the vice-president in charge of operation, and the committee is composed of the assistant general manager, superintendent of transportation, officers of the traffic, refrigerator, claim, accounting, mechanical, and safety departments, together with employees selected from the ranks of agents, train, engine and yardmen. A day or two prior to the system meeting the members of the standing committees meet and thrash out the questions confronting them and endeavor, with uniform success, to submit a unanimous report. These reports, as well as the subjects appearing on the docket, are discussed freely from the floor of the general session and any employee in attendance not only has the right but is expected to voice his objections to and take issue with any portion of the standing committee's report which in his opinion fails in any essential. Mechanical department representatives take a keen interest in these meetings and render valuable assistance by replying in an educational way to technical questions propounded by train, engine, and yard men.

Representatives of the traffic department are in attendance at these meetings, give us expert advice on tariff stipulations and requirements and point the way through which certain beneficial changes may be secured. We have found that the activity of the freight container bureau in securing better containers has been an important factor in the reduction of this loss and damage account; however, much more can be accomplished along these lines.

The New York Central's Plan

J. H. Hustis, Jr., outlined the New York Central's method of reducing claims in abstract as follows:

It should be possible to continue the American Railway Association's original slogan to "Cut Loss and Damage in Half" but the

fulfillment of the slogan the second time is going to be harder to realize than it was the first time. We may have to revise our methods somewhat and strengthen our machinery in some respects in order to reach the new goal.

In order to achieve the best results from an attack upon any problem we should have: (1) complete and detailed information as to just what the problem consists of; and (2) an efficient and smooth working organization to make the attack.

Considering the first factor, the A. R. A. standard form No. 1 calling for a uniform classification of loss and damage claim payments according to certain specified causes and commodities was the first step in the right direction, but is it going to be sufficient to guide us in our work of cutting loss and damage in half the second time? Will we not have to have more detailed information as to commodities and more accurate information as to causes?

Recently in working on the fruit and vegetable problem, the Committee on Freight Claim Prevention found it necessary to ask the 20 railroads handling the bulk of this traffic to split up the commodity group shown on Form A. R. A. 1, as Fresh Fruits and Vegetables, into 25 component parts. They could not attack the problem intelligently without knowing whether the trouble was with lemons, grapes, peaches, onions, lettuce or some other commodity making up the general heading of Fresh Fruits and Vegetables.

The education of the station forces which inspect damaged freight and investigate lost freight, coupled with closer coordination of the work of these forces with the freight claim departments will enable us to determine the cause of a great part of this unlocated loss and damage. In a general way, the organization of loss and damage prevention work on the railroads of the United States has been worked out in two different ways; one based upon centralization and the other based upon decentralization. Under the centralized plan a freight claim prevention department is created either as a bureau in the freight claim department, or as a separate organization in the operating department under the jurisdiction of a freight claim prevention officer who has nothing to do with claim settlement work. This department or bureau usually has a number of clerical employees and outside inspectors and all exceptions reports, OS&D reports, and investigations of claim producing conditions are centralized in it. Under the decentralized plan the committee form of organization is emphasized to a greater degree, reports are handled from division to division and are not centralized in one office, and the work is split up to a greater degree among the line officers of the operating department. Both plans have their good points and their elements of weakness.

On the New York Central a combination of the two forms of organization is in effect tending more to decentralization than centralization. There are approximately 80 station and yard loss and damage prevention sub-committees with agents and general yardmasters as chairmen and with a membership consisting of employees actually engaged in receiving, checking, billing, loading, switching and moving freight. There are 21 divisional committees, each with a division superintendent as chairman, and composed of the ranking officers of all departments on the division together with other representative employees. On the larger divisions each of these committees has a permanent secretary who, though reporting directly to the superintendent but also working under the guidance and technical direction of the secretary of the general committee, devotes his entire attention to this work. These men handle OS&D and exception reports, carry out the policies of the committee, attend meetings of and coordinate the work of the station and yard sub-committee. There are three general committees with an assistant general manager or general superintendent as chairman and a membership consisting of all department heads. The two larger general committees also each have a permanent secretary devoting his entire attention to this work and coordinating the work of the divisional committees in their territory. There is a superintendent of property protection with jurisdiction over the railroad police protection as well as all loss and damage prevention activities.

Proper Presentation of Claims with Supporting Documents Expedites Adjustment

H. R. Park, traffic manager of the Chicago Live Stock Exchange, emphasized the necessity for the proper presentation of claims to secure prompt settlement in part as follows:

In order to bring about the earliest possible satisfactory settlement of a claim the procedure of presenting a claim with the proper supporting documents and the proper supporting facts should be followed. A properly prepared claim is halfway to the voucher desk. A shipper suffers a loss and is satisfied it was brought about by negligence on the part of the carrier. In nearly every instance he is fully aware of many facts that cause him to reach that conclusion. He is thoroughly saturated, so to speak, with the knowledge that the loss would not have occurred had the carrier properly performed. He prepares and presents a claim to

the railroad company. Unfortunately the claim is generally insufficiently supported. The knowledge he has satisfies him of the existence of liability on the part of the carrier. The freight claim investigator, however, who receives the papers has no knowledge, information or impressions as to liability or non-liability. He accepts the papers as picturing a state of affairs and is advised, of course, by the claim that the carrier is responsible for the loss.

A claim presented to a railroad company is to the railroad company claim investigator an allegation of improper handling in transit and a contention that the claimant lost a certain amount of money due entirely to their improper handling. To properly support the liability feature certainly the document showing delivery to the carrier of the property should be furnished,—the original bill of lading. In the absence of this document explanation as to why it is not furnished should be given the railroad, together with information as to what the bill of lading contains; in other words, the date upon which it was delivered to the carrier and if time is a feature in the claim, the time of day, and particularly the condition of the goods when delivered to the carrier, and if the claim involves the question of damage in transit, involving the question of packing, then documentary evidence in the shape of affidavits from the person in charge of the packing should be furnished.

In the question of concealed loss or damage at destination, documentary evidence should also be presented as to the extent of the damage, and if possible, what in the opinion of the person un-

packing brought about the loss. The actual measure of damage is not less important than the question of liability and evidence should be presented with the claim showing just how the aggregate loss is arrived at. Invoice, market papers, copies of account sales covering disposition of similar commodities in good condition or some other method should be pursued in order to satisfy the freight claim department that the amount claimed is proper. Where possible claimants should furnish the claim department with information as to specific acts of negligence on the part of the railroad that brought about the loss in question.

A railroad claim department should have its preferred claimants and those preferred claimants should be no one other than those who properly support their claims at the time of presentation with the proper documents substantiating the existence of liability and the amount of the loss claimed.

Section 10 of the Act to Regulate Commerce provides that a carrier cannot pay and a shipper cannot receive money through claim payments that are not legally due. There is a severe penalty for violation of this law. The carrier, therefore, must be very careful in paying claims to see that claims are paid only when due. To accomplish this end the carriers must investigate claims presented to them and develop the facts as to the handling in transit in order to develop whether or not they are responsible for the loss. The carrier is further obliged to see that the amount paid for a loss is the proper one and is entirely chargeable to their negligence.

Norfolk & Western Holds Efficiency Meeting

Suggestions Offered Result in Better Service, Improved Operation and Reduction of Claims

THE NORFOLK & WESTERN held its fifth yearly system efficiency meeting, conducted by the claim department, on May 22, 23 and 24 at the Gibson Hotel, Cincinnati, Ohio, and it was attended by 125 shippers and 300 delegates from all branches of the railroad service, from trackman to general manager. The officers and employees of the company were carried to Cincinnati on a special train which served as headquarters for the men until the close of the meeting. The meeting was opened with addresses of welcome by Mayor George P. Carrel and A. J. Freiberg, president of the Chamber of Commerce. The response on behalf of the visitors was made by Judge G. E. Cassell, publicity agent of the road. The principal address at the opening session was made by Joe Marshall, of the Freight Claim Division, American Railway Association. C. G. Richmond, superintendent of stations and transfers of the Illinois Central, presented a motion picture taken on that road and showing in an interesting manner, everyday happenings in freight handling. C. Q. Lewis and Raymond Boos, representing W. H. Miner, presented a motion picture of the "slow motion" type depicting the manner in which rough handling of cars results in damage to freight. The first day was devoted to greetings and the preparation of reports by committees.

Since the inauguration of these meetings claim payments have been reduced and more efficient methods have been put into use. Local efficiency clubs, as an outcome of the general meeting, are organized at 22 of the larger stations. The chairman of the local efficiency club automatically becomes a delegate to the system meeting. The members in addition select a representative. The other delegates are selected by the various superintendents and departmental heads.

Ten committees dealt with ten subjects, as follows: "Selling Service to Patrons and Employer"; "How to Handle and Hold Freight Patrons"; "Receiving Freight and Selecting Equipment"; "Accurate Loading and Stowing"; "The Job in the Yard and on the Road"; "Rough Handling and Delay"; "Freight Accounting and Station Reports"; "Delivering Freight and Demurrage"; "Claim Payments and Prevention"; and "Overcharges and Undercharges."

These committee reports contained a great amount of useful discussion and suggestion. Exigencies of space-limits forbid the reproduction of this interesting matter in this place; but to give the reader an idea of the scope of the different reports, those portions which are of most interest to readers not connected with the Norfolk & Western are abstracted below.

Selling Service to Patrons

Selling transportation is not essentially different from selling any other standard and highly competitive commodity. The salesman should obtain the most intimate knowledge possible of the patron's business, including destinations of the output; and should demonstrate that he knows to what extent his road can meet the needs of the patron. He should have a general knowledge of commodities produced in other soliciting districts which might find a market within his territory.

Suggestions for the Ticket Salesman

Know your people, greet them by name and don't disclose the fact, if possible to avoid it, that you have forgotten a name. Cultivate a habit of cheerfulness at the window and thank each purchaser for his business. Take his point of view. Help him work out his schedules so that he may use more of our mileage.

Get out on the platform when trains arrive and watch out for persons alighting, who seem at a loss as to their next move. Find out whom they wish to see and get them in touch with their party. See that ladies, elderly persons, children and the infirm are cared for on the spot.

Put out notices in your station that you are ready at any and all times to be of any possible and proper assistance and then make good on that proposition. Arrange lists of persons who, in your opinion, can be interested in seasonable travel, and place these with connecting lines and with the boards of trade in the territory to which you wish to route them. Don't overlook proper and prompt handling of baggage. Remember also that freight traffic frequently follows properly handled passenger business. Suggest to each passenger the convenience of a round trip ticket.

Don't hesitate to instruct shippers as to loading. When cars are going on demurrage get the consignee on the phone and caution him: this often speeds things up. Keep in touch with what's going on. Suggest sources of supply that will be helpful to this line and to concerns located on it.

Accurate Loading and Stowing

The receiving clerk must see that the packages he receives from the shipper are properly marked and the bill of lading is in strict

accordance with markings and is perfectly legible. Every effort should be made to load freight in such a manner as to hold the number of transfers to a minimum. A survey of the loading schemes of the different stations and transfer points should be made, looking toward the loading of more "set out" cars over the local divisions.

Rigid supervision should be maintained over the stowers in their assigned work. Merchandise cars being loaded should have frequent inspection during the course of the day's work. Hold meetings of the freight handlers at all stations, where the number justifies it, for the purpose of educating them.

Freight Accounting and Station Reports

Stations should be provided with account books enabling cashiers to make a daily balance and to render report of uncollected items with promptness so that auditors' agents can check stations in minimum time. A method should be devised for preparing postal notices by use of carbon instead of press copying. Correction Form 14-B should be abolished. [This committee recommended the consolidation of certain reports, where information is duplicated.]

Practice should be uniform at all stations in the binding, filing and marking of records. A committee should be appointed to make a study of all reports with a view of consolidation wherever possible.

Delivering Freight

Industries which have several spots on their tracks for unloading should furnish spotting instructions for all cars well in advance of arrival. Telephone notice of arrival should be promptly given upon the placement of a car, in addition to the required written notice. Cars are sometimes accepted from connecting lines without sufficient information to enable us to give legal notice and we pay per diem without the protection of demurrage. All station warehouses should be checked once each week. The practice of taking receipt for goods at the cashier's window at the time charges are paid and before actual delivery of the goods should be discontinued.

Attention is called to the growing practice of setting off at local stations small consignments of freight in foreign cars. A large proportion of the freight consigned to small stations is for consignees located ten miles or over from the station who enjoy five days' free time, and even more if the distance is greater. The revenue derived from such shipments is often insufficient to pay the per diem.

The maintenance of accurate demurrage records is of such importance that this committee recommends that the utmost care be exercised in obtaining capable demurrage men when vacancies occur. Nothing will incur the displeasure of a patron quicker than the presentation of an erroneous demurrage bill; a demurrage bill should be presented only after a careful recheck of the entire record of detention to substantiate its correctness.

Claim Payments and Prevention

Each division, terminal or freight station should appoint a responsible committee to function continuously with a view of overcoming this leakage. In case of rough handling each large terminal should have a live committee working day and night to see if yard crews are switching trains too fast, if there is unnecessary switching of cars to and from warehouse and whether it is more economical to truck freight and line up cars so as to avoid unnecessary switching. On each division terminal meetings should be started to interest the engine and train crews, such meetings to be presided over by the superintendent, the trainmaster, or the road foreman of engines. Loading and stowing of freight in cars is largely left to truckers or packers. A platform committee should supervise this work and create a spirit of a rivalry between packers. At every point where possible two companies of employees should hold fire drills. It is recommended that motive power department keep locomotives in such shape as to reduce hazards of fire at all times.

Overcharges and Undercharges

The bill of lading description often does not agree with what the article is entitled to be described in the classification. The shippers' attention should be called to every violation of this kind. In requesting rates from traffic department, complete information regarding the shipment should be given, such as the route desired, the delivery point, and how shipment is packed or marked. An examination of agents' tariff files should be made at least once a year. It would be beneficial if the local efficiency organizations would at each meeting consider some one phase that enters into overcharges and undercharges. When freight is overcharged the company is apparently out nothing, but we must bear in mind that it is expensive to adjust claims and that overcharges are extremely annoying to shippers. Undercharges of course are troublesome. A demand for more freight charges by the legal department or from the claim department does not tend to put our patrons in a very friendly mood.

Freight Car Loading

WASHINGTON, D. C.

REVENUE FREIGHT CAR loading fell off in the week ended May 21 because of the Memorial Day holiday, although on a daily basis the loading was in excess of that of the week before. The total was 819,904 cars, a decrease of 112,780 as compared with the corresponding week of last year and an increase of 80,345 as compared with 1922. Loading in the Southwestern district was greater than that for the corresponding week of last year, as was that of grain and grain products, but all other classes of commodities showed decreases. Coal loading was 51,451 cars less than that for last year. The summary as compiled by the Car Service Division of the American Railway Association follows:

REVENUE FREIGHT CAR LOADING—WEEK ENDED MAY 31, 1924

| Districts | 1924 | 1923 | 1922 |
|---------------------------------------|------------|------------|------------|
| Eastern | 185,486 | 224,267 | 165,351 |
| Allegheny | 164,618 | 209,318 | 140,714 |
| Pocahontas | 37,472 | 40,483 | 46,880 |
| Southern | 123,425 | 128,528 | 122,040 |
| Northwestern | 132,082 | 152,323 | 119,151 |
| Central Western | 122,476 | 125,218 | 102,129 |
| Southwestern | 54,345 | 52,547 | 49,294 |
| Total Western districts | 308,903 | 330,088 | 270,574 |
| Commodities | | | |
| Grain and grain products | 36,284 | 32,401 | 37,655 |
| Live stock | 27,467 | 29,257 | 27,234 |
| Coal | 120,215 | 171,666 | 86,289 |
| Coke | 8,188 | 14,389 | 8,924 |
| Forest products | 67,433 | 73,659 | 31,220 |
| Ore | 56,350 | 73,387 | 57,979 |
| Mdse. l.c.l. | 214,074 | 216,763 | 216,335 |
| Miscellaneous | 289,893 | 321,162 | 273,923 |
| Total, May 31 | 819,904 | 932,684 | 739,559 |
| May 24 | 918,213 | 1,015,532 | 806,877 |
| May 17 | 913,407 | 992,319 | 780,953 |
| May 10 | 909,187 | 974,741 | 767,094 |
| May 3 | 914,040 | 961,617 | 747,200 |
| Cumulative total January 1 to date .. | 19,561,235 | 19,957,899 | 16,606,236 |

The freight car surplus during the last week of May showed an increase of 7,514 cars as compared with the week before, to a total of 338,526, which included 168,913 coal cars and 133,216 box cars.

For the Canadian roads the surplus was 19,225, including 16,575 box cars and 150 coal cars.

Transportation Plank in the Republican Platform

The text of the Republican platform plank on railroads, as adopted by the convention in session at Cleveland, Ohio, follows:

"The people demand and are entitled to have prompt and efficient transportation at the lowest rates consistent with good service and a reasonable return upon the value of the property devoted to public service.

"We believe that the American people demand, and we favor a careful and scientific readjustment of, railroad rate schedules, with a view to the encouragement of agriculture and basic industries, without impairment of railroad service.

"The present laws regulating railroads which were enacted to meet post-war conditions should be modified from time to time as experience shows the necessity therefor.

"The consolidation of railroads into fewer competitive systems, subject to the approval of the Interstate Commerce Commission, should be provided for.

"The Labor Board provisions of the present law should be amended, whenever it appears from experience that such action is necessary. Collective bargaining, mediation and voluntary arbitration are the most important steps in maintaining peaceful labor relations and should be encouraged. We do not believe in compulsory action at any time in the settlement of labor disputes.

"Public opinion must be the final arbiter in any crisis which so vitally affects public welfare as the suspension of transportation.

"Therefore the interests of the public require the maintenance of an impartial tribunal which can in an emergency make an investigation of the facts and publish its conclusions. This is essential as a basis for popular judgment.

"We favor a stable, consistent and constructive policy toward our railroads."

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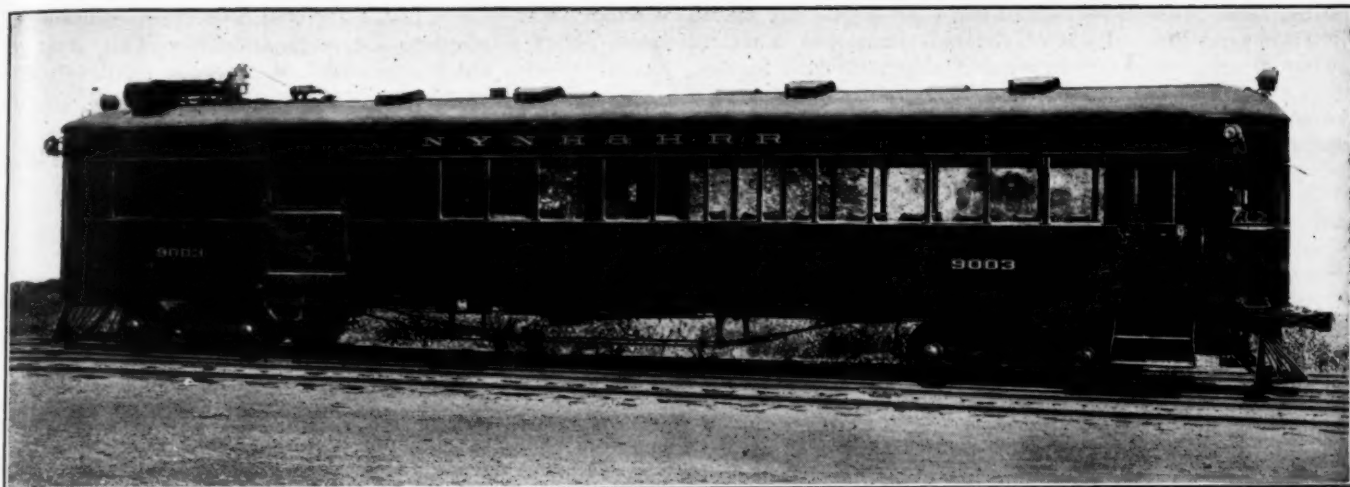
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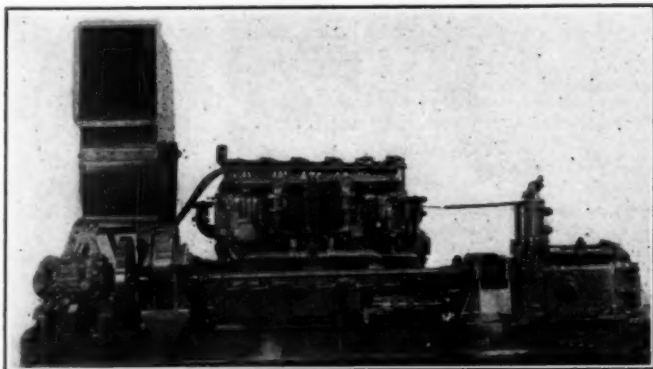


A Combination Passenger and Baggage Car Propelled by a Ricardo Engine Through a Transmission Consisting of One Hydraulic-Delivery Pump and Two Hydraulic Variable-Speed Motors

Gasoline Passenger Car With Hydraulic Drive

Waterbury Oil Transmission Governs Speed and Direction
and Gives Remarkable Flexibility of Control

FOR SOME TIME the New York, New Haven & Hartford has had in operation a combination passenger and baggage unit car which is propelled by a 150 hp. Ricardo engine, through a transmission consisting of one Size 50, Universal hydraulic variable-delivery pump, supplying oil to two Size 20, Universal hydraulic variable-speed



A 150 h. p. Ricardo Engine Which Drives the Pump Unit Air Fan and Air Compressor

motors, one mounted on each truck frame. The actual light weight of the entire car, including engine and transmission, is 52,800 lb.

The car body has an overall length of 57 ft. 8 in. and is designed to carry approximately one ton of baggage and will seat 60 passengers, having room for 15 in the smoking compartment and 45 in the main passenger compartment. The maximum speed of the car on straight, level track when loaded is 40 m.p.h. Provision is made for double-end control.

Description of the Motor

The Ricardo engine is rated at 150 hp. when running at 1,200 r.p.m. However, in this installation the speed is being limited to 950 r.p.m., with a consequent limitation in power. In addition to driving the pump unit, the engine

drives a jack shaft by means of a Whitney silent chain. This jack shaft in turn supplies power to the fan, air compressor and pump for supplying oil to the speed gear control. Gasoline for the engine is carried in two 25-gal. tanks suspended under the floor of the baggage compartment.

The fan has an approximate displacement of 3,500 cu. ft. of free air per min. when running at 610 r.p.m., and it is estimated that it will not require over five horsepower to drive the fan at the above mentioned speed. The fan is mounted forward of the engine and draws air directly from the outside. The air from the fan is blown through a tubular radiator and exhausts through the roof. The cooling water for the engine is circulated through the radiator by means of a pump, which is part of the engine.

The air compressor is the Westinghouse F-1-B, which has a nominal rating of 15 cu. ft. of free air per min. when operating at 220 r.p.m. against 100 lb. air pressure. However, as only 50 lb. of air pressure is to be carried for this installation, the speed is being put up to 330 r.p.m. and delivery will be about 25 cu. ft. per min. At this pressure it is estimated that the power required will not exceed two horsepower. The air compressor is driven from the jack shaft through a Thermoid flexible coupling.

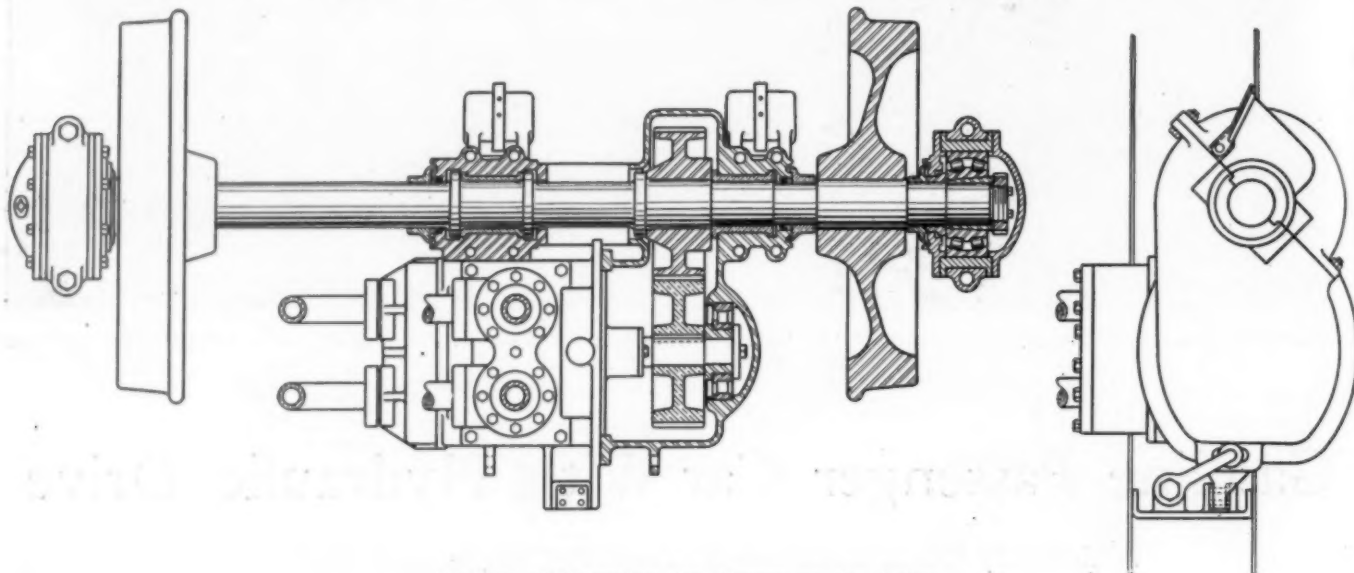
A Diehl Manufacturing Company's generator is driven from the front end of the engine through a flexible coupling. This generator is shunt wound and delivers 23 amperes at 33 volts when operating at 950 r.p.m. It supplies current for starting, lighting and ignition, and also charges a 32-volt battery.

A Waterbury Gear Company's Size 50, Universal hydraulic, variable-delivery pump is driven from the engine through a double helical gear reduction, ratio 53 to 23, so that when the engine is running at a speed of 950 r.p.m., the pump, or so-called A-end of the transmission, runs at 410 r.p.m. The Waterbury variable speed gear consists of an oil pump designated as the A-end and a hydraulic motor designated as the B-end. Oil from the pump, or A-end, is carried through pipes running just below the floor to the two motors, or B-end. In order to provide for movement of the trucks when the car is going around curves, or when encountering obstacles

on the rails, two ball joints and one sliding joint are placed in each pipe line. Each of the ball joints has sufficient swing to allow for a movement of approximately 15 deg. each way. This movement is somewhat in excess of what will be encountered when the car is on a curve having a 100-ft. radius. The sliding joints are placed in vertical planes and

bottom plate. These plates are held between other hardened steel plates attached to the truck transom. This arrangement provides for misalignment of the axle relative to the transom and also allows for a slight movement of the axles up and down due to the flexing of the springs.

On each side of this suspension lug are two lugs engag-



Method of Mounting the Motors on the Axles

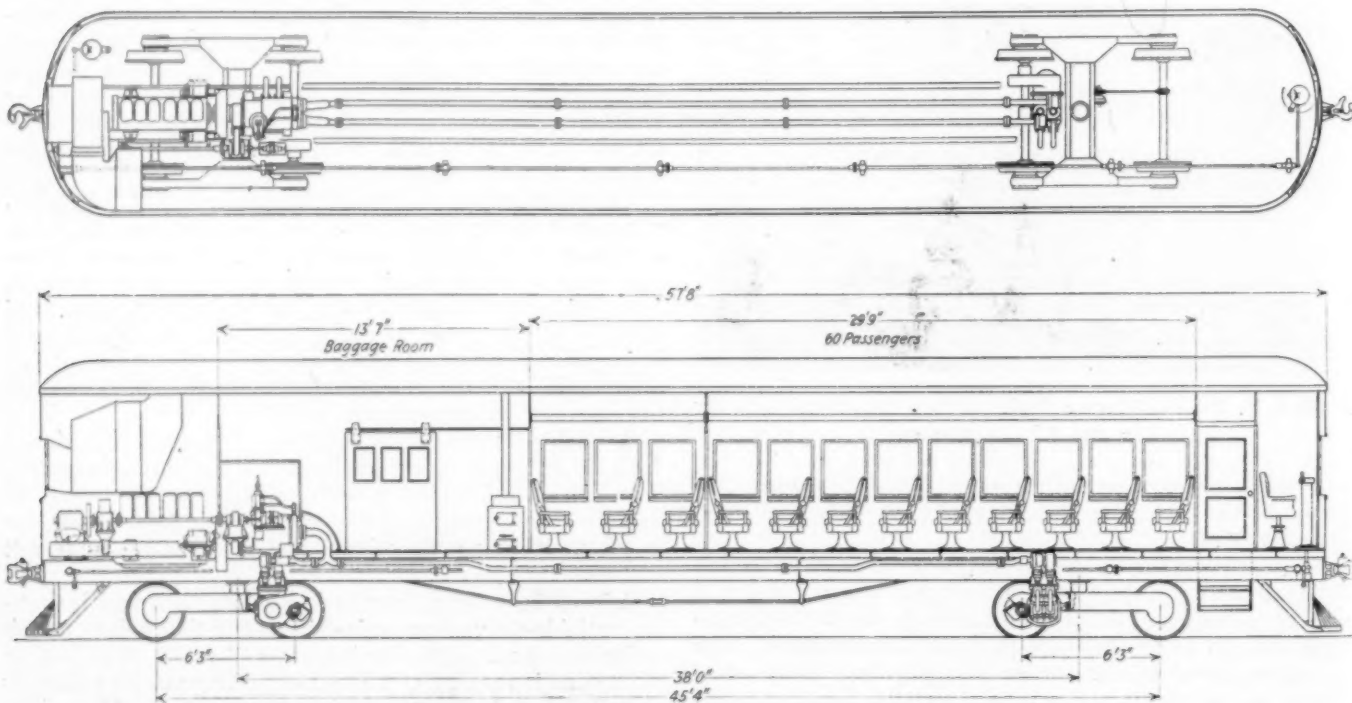
take care of the vertical movement of the trucks when passing over obstructions on the rails, or the movement of the car body when the springs are flexed.

Method of Mounting the Motors

The motor units are suspended on the axles by a method similar to that employed in suspending electric motors on

ing links, which in turn are attached to the truck transom. These auxiliary lugs only come into action in case of failure of the main suspension lug and prevent the motor from dropping to the track if the main suspension lug should fail.

Gearing is used between the motor shaft and the car axle. The maximum speed of the motor unit is 515 r.p.m. At this



Plan and Elevation of Gasoline-Hydraulic Passenger Car

electric locomotives. The lugs for the bearings are cast integral with the case of the motor unit. On the opposite side from the axle a suspension lug is provided which is also cast integral with the case and carries a hardened steel top and

speed the car axle will run at 450 r.p.m. As the car wheels are 30 in. in diameter, this is equivalent to a speed of 40 m.p.h. The housing for these gears is cast integral with the motor end case.

The engine, pump unit, fan, generator, air compressor and servo-motor oil pump are all mounted on a structural steel sub-base. This sub-base is insulated by means of rubber pads from the main frames of the car. This prevents the telephoning of vibration and noise back into the passenger compartments. The rubber insulating pads are protected from oil and grease in order to prevent deterioration of the rubber.

Ventilation of the engine compartment is effected at the will of the driver by opening a gate into the fan casing so that part of the air taken by the fan will be drawn through the engine compartment. The car is heated by a Peter Smith Company's No. 2 P. O. heater, complete with motor wound

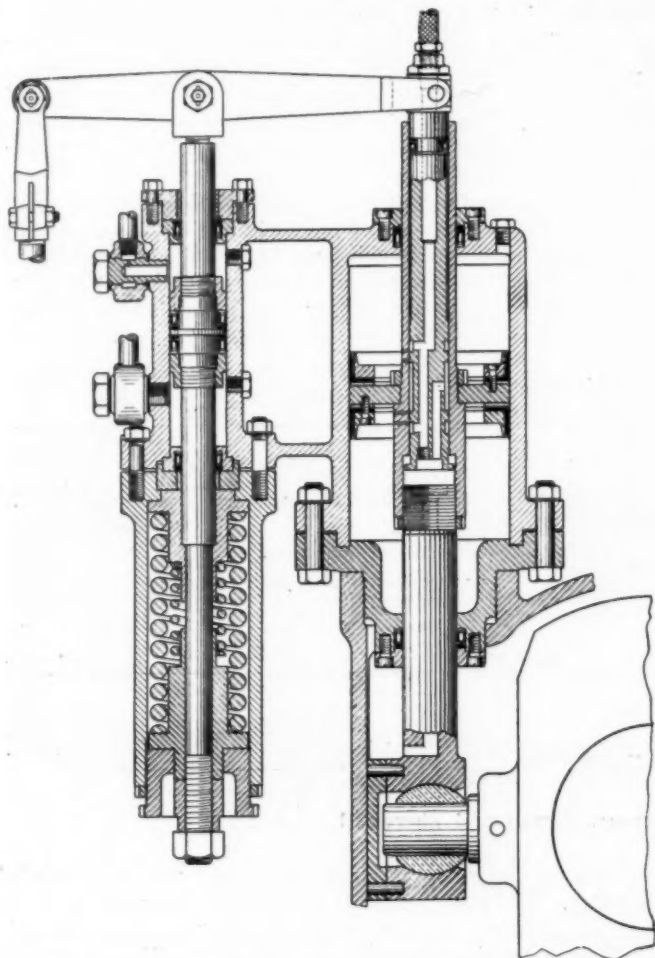
valve is effected by means of links and an oscillating shaft which runs the entire length of the car. The movement, through approximately 90 deg. of a small hand lever in either driving compartment oscillates this shaft through approximately 30 deg. This is sufficient to move the control valve from neutral to full stroke in the opposite direction, with corresponding reversal in direction of movement of the car. The control valve is incorporated in the servo-motor piston, and a slight movement of the valve uncovers a port in this piston, allowing pressure oil to flow into the main servo-motor compartment, moving the piston in the same direction the valve has been moved. When the piston moves an amount equal to the movement of the valve, the port is closed, shutting off the flow of oil and bringing the control shaft of the speed gear to rest. In this position the control shaft is oil locked until the control valve is again moved. This method of control is as positive as a screw and nut, but relieves the operator of practically all effort.

The oscillating control shaft above mentioned is mounted in ball bearing pillow blocks on the frames of the car, and universal joints are introduced at necessary intervals in order to prevent binding of the shaft in the bearings due to twisting of the car frame. By these means the effort required to move this control shaft is reduced to a minimum.

A pressure control is incorporated in the control system. This pressure control begins to operate at about 450 lb. oil pressure. As the oil pressure exceeds 450 lb., the stroke on the pump is automatically cut down so that by the time the oil pressure has reached 1,000 lb., the stroke has been reduced to one-fourth of the full stroke. The design of this pressure control is such that at speeds of from about 25 miles up, the horsepower output of the engine is maintained practically constant, and the speed of the car is determined by the oil pressure in such a way that it is impossible to stall or overload the engine on grades. It is also unnecessary for the operator to take any action when approaching a grade as the pressure control will operate automatically to do what he might do, but in a much more uniform manner.

The car wheels have a diameter of 30 in. and the main diameter of the car axle is $3\frac{3}{4}$ in. This is increased to $3\frac{7}{8}$ in. in the motor journals and a shoulder $5\frac{1}{2}$ in. in diameter is provided on each side of the center motor journal in order to take care of the end thrust due to the tendency of the motor to shift on the axle when the car is going around curves. The driving gear on the car axle is a steel forging having a nominal bore of $4\frac{1}{16}$ in. No keys are provided for this gear, but the gear is pressed on to the axle by a pressure of 35 to 45 tons.

Suitable guards and dust rings are provided to prevent dust getting into the gears and main motor journal bearings. Lubrication of the motor journal bearings is provided for by incorporating waste filled oil wells in the journal castings. These oil wells are similar in construction to those used on motor mountings on electric locomotives.

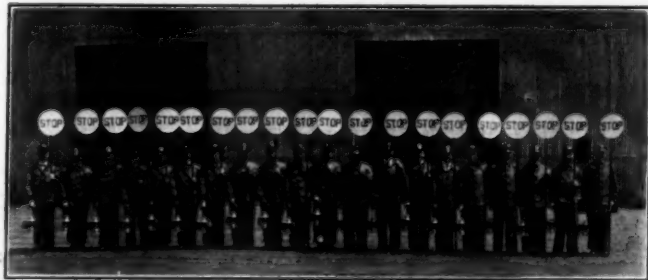


Control Mechanism for Universal Hydraulic Pump

for 32 volts and blower for forced ventilation, located in the baggage compartment of the car. The car is supplied with standard air brake equipment and also with hand-operated brakes. The main axle journals of the car are mounted in S. K. F. standard roller bearings, and couplers are supplied at each end of the car.

Flexibility of Control

With the Universal hydraulic variable-speed transmission all variations in the speed of the car, as well as reversal of direction of movement, is effected in the hydraulic variable delivery pump. At all speeds of the car from full speed in one direction to full speed in the opposite, the engine runs at constant speed and in one direction only. The control of the Universal hydraulic delivery pump is effected by means of a servo-motor. This consists of a pressure operated piston acting directly on the control shaft of the pump. Oil is admitted to either side of this piston at the will of the operator by a small control valve. Movement of the control



Safety on the Pennsylvania

Some of the P. R. R. men who participated in the New York City Safety Parade.

Electric Switch Lighting in Yards on N. C. & St. L.

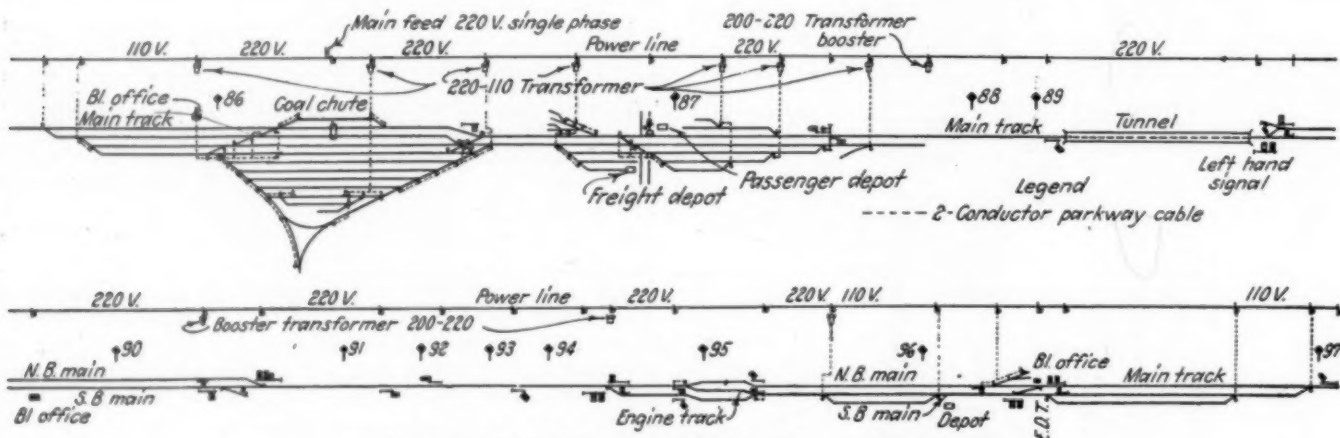
By Geo. S. Pfisterer

Signal Engineer, Nashville, Chattanooga & St. Louis,
Nashville, Tenn.

THE NASHVILLE, CHATTANOOGA & ST. LOUIS has installed electric switch lamps to replace oil lights in two large yards, one at Cowan, Tenn., and the other at Chattanooga, Tenn. At Cowan, the idea of lighting the 70 switch lamps electrically was brought about by the fact that electric power was available at a reasonable commercial rate at the coaling station, which is operated electrically and located at about the center of the yard. The installation was such a success that electric lighting was later installed in the yard at Chattanooga, which includes 170 switch lamps. One striking feature of the electric-lighted switch lamps at these points is their improved appearance and uniformity of light in all lamps, which furnish greater visibility at longer distances.

Construction Features

Parkway cable laid in ditches and covered with clay was used for the distribution from the feed line to all of the switch locations. Metal junction boxes were used where



Yard and Signal Layout Between Cowan and Sherwood

taps were taken from a cable to a switch, and after the connections were completed the box was filled with asphalt pitch.

In connection with these installations the 220-volt feed line was extended several miles to include a number of automatic signal locations where storage batteries, charged by rectifiers from the 220-volt line, have replaced primary cells. At Cowan the 220-volt line extends for 11 miles within which territory 216 cells of storage battery have replaced 700 cells of primary battery formerly used for the automatic signals between Cowan and Sherwood. At Chattanooga yard advantage was taken of the 220-volt supply line for the operation of rectifiers to charge 34 cells of storage battery, which replaced 141 cells of primary battery used for signal purposes.

Cost of Installations and Savings Produced

The layout of the yard at Cowan, Tenn., is shown in the diagram. This installation, including 70 switch lamps, cost \$1,929, and the savings produced are as follows:

| | |
|---|---------|
| One lampman's wages, per year..... | \$744 |
| Oil and other lamp supplies..... | 488 |
| Total | \$1,232 |
| Less cost of current and maintenance of electric lamps per year.. | 404 |
| Net saving per year..... | \$828 |

This is a saving of 43 per cent on the investment of \$1,929.

The installation at Chattanooga, including 170 switch lamps, cost \$2,788, and effected the following savings:

| | |
|--|---------|
| Two lampmen's wages, per year..... | \$1,488 |
| Oil and other lamp supplies..... | 1,071 |
| Total | \$2,559 |
| Less cost of current and maintenance of electric lamps per year. | 980 |
| Net saving per year..... | \$1,579 |

This saving of \$1,579 is equal to approximately 55 per cent on the investment of \$2,788.

Voltage and Operation of Lamps

On account of the rugged filament construction it has been found that the 110-volt, 2-candle power lamp will withstand the vibration of the switch stand under traffic much better than Mazda filament lamps. The lamp socket is mounted on a wooden block which fits in the lamp body in place of the oil fount. These units are assembled in our signal shop at a cost of 80 cents each, including the 2-candle power carbon lamp at 15 cents.

Manufacturers have recently placed on the market a small 110-volt transformer which, together with a 10-volt, 2½-watt lamp can be used in a switch lamp body. We are testing one type of these transformers and from a lighting standpoint the results are very satisfactory. However, where a large number of switches are to be equipped the cost of these

separate transformer units makes their use of doubtful economy. The cost of such a transformer is quoted at \$3.50 and in addition the cost of a 10-volt, 2½-watt lamp is 23½ cents, making the cost of such a unit \$3.86 as compared with only 80 cents for the complete unit using the 110-volt carbon lamp and wooden block.

The lighting of the signal lamps is a different proposition, for at each signal location there is a low voltage lighting tap on the rectifier and a lighting relay. Therefore, on the signals between Cowan and Sherwood, 10-volt, 2½-watt lamps of the Signal section, A.R.A. design are used. These lamps receive alternating current energy through a lighting relay so connected that in case of a power line failure the lights are switched automatically to the storage battery, which is charged through rectifiers from the 220-volt line.

On the main line outside of yard limits three or four switches are located as near signals that the 10-volt circuit for signal lighting can also be used for these switch lights and thus save an additional transformer.

THE CHICAGO & ALTON has reduced the running time of its Chicago-Kansas City train, the Hummer, 1 hour and 30 min. The train will now leave Chicago at 8 p. m. instead of 6 and will arrive at Kansas City at 8:15 a. m. instead of 7:45.

Northern Pacific Suffers from Low Rate Level

This Combined with Heavy Maintenance Expenses Reduces Rate of Return to But 2.98 Per Cent in 1923

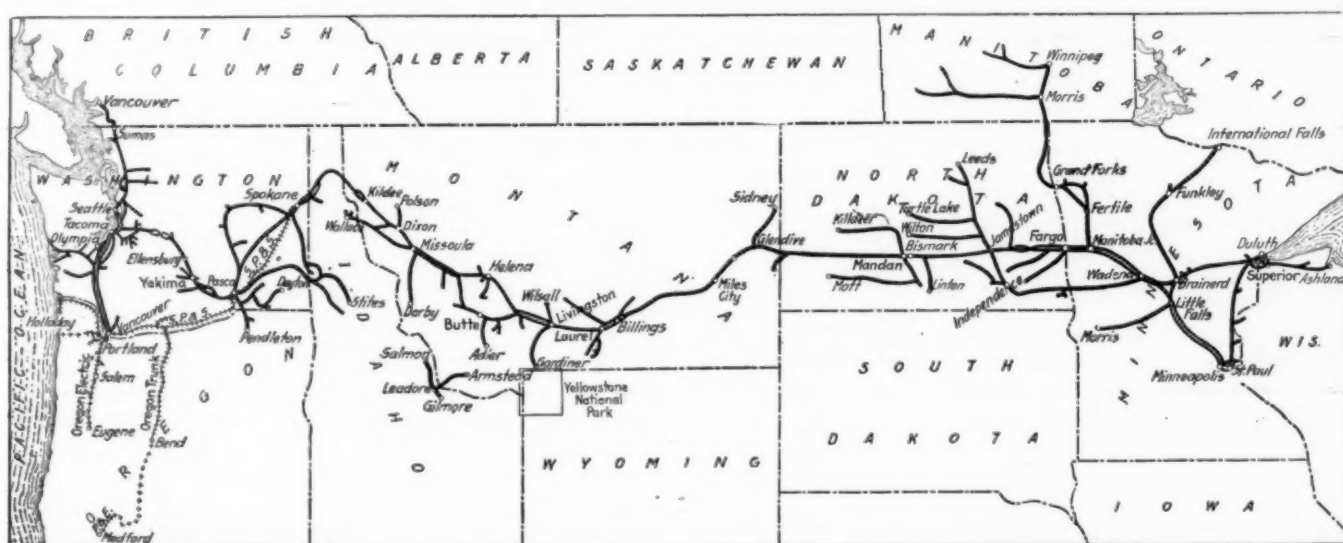
THE NORTHERN PACIFIC reported for 1923 a net corporate income available for dividends of \$12,981,426. The 5 per cent dividends that the property has paid since 1922—prior to 1922 the rate was 7 per cent—amount to \$12,400,000. There was thus a balance after dividends in 1923 of \$581,426. This compared with \$2,656,929 in 1922; it was the lowest balance after dividends that the property has reported for a long period of years.

Net operating income or net after rents—the figure which for the carriers as a whole or by groups is supposed to be equivalent to 5¾ per cent of the property investment devoted to the service of transportation—totaled for the Northern Pacific in 1923, \$17,100,557. This compared with

of \$30,057,760. The net operating income of 1923 was equivalent to but 57 per cent of the standard return. For the roads in the northwestern region as a whole the 1923 net operating income was equivalent to 76 per cent of the total standard return of all the roads in the region. The Northern Pacific was, therefore, less favored than its neighbors.

Low Rate Level

There are two essential reasons why the Northern Pacific should have had such a low net in 1923. The first is the low rate structure of the Northwest. The other is the heavy expenditure that the Northern Pacific made in 1923 for maintenance, both of way and structures and of equipment. The



The Northern Pacific

\$19,450,514 in 1922. The net operating income for the roads of the United States as a whole in 1923 was equivalent to 5.10 per cent of the tentative valuation established by the Interstate Commerce Commission in Ex Parte 74, plus subsequent additions. For the roads as a whole, the net operating income was equivalent to 4.47 per cent of their book investment (including materials and supplies, and cash). The rate of return on book investment in 1923 for the northwestern region was 3.42 per cent. The Northern Pacific net operating income of \$17,100,557 above mentioned was equivalent to only 2.982 per cent of that road's property investment.

Figures for the past several years follow:

NORTHERN PACIFIC NET OPERATING INCOME AND RATE OF RETURN

| Year | Net operating income | Rate of return on investment in road and equipment and materials and supplies |
|-----------|----------------------|---|
| 1916..... | | 6.715 |
| 1917..... | | 5.946 |
| 1918..... | \$28,317,433 | 4.603 |
| 1919..... | 18,450,790 | 2.720 |
| 1920..... | 7,949,459 | 1.472 |
| 1921..... | 10,843,826 | 1.993 |
| 1922..... | 19,450,513 | 3.537 |
| 1923..... | 17,100,557 | 2.982 |

The Northern Pacific had a standard return for operations during federal control (based on the annual average of net operating income for the three years ended June 30, 1917)

situation is shown in its essentials by the following comparison. The average annual operating revenues of the Northern Pacific for the test period (covering the three years ended June 30, 1917) was \$74,857,778 and in 1923, \$102,002,060—an increase of 36.26 per cent. The average annual operating expenses for the test period were \$41,717,352 and in 1923, \$80,364,810—an increase of \$38,647,457 or 92.64 per cent.

Average earnings per ton-mile of the Northern Pacific in 1923 were 1.132 cents. The average for all the Class I roads of the country in 1923 was 1.116 cents. As compared with 1913, however, which is the base year usually accepted, the ton-mile earnings of the Northern Pacific in 1923, showed an increase of only 34.9 per cent, whereas the average ton-mile earnings for all roads showed an increase over 1913 of no less than 55 per cent. The reason that the rise in the rate level of the Northern Pacific has been less than that of the country as a whole goes back to the fact that the rate increases of the federal control period and in the decision in Ex Parte 74 were greater in other sections of the country than in the Northwest, and to the fact that the rate reductions in 1922 were greater on agricultural products than on other commodities. The northwestern roads have suffered from the decreased buying power of the Northwest and from the situation as to transcontinental rates. The result of reduced buying power has been a lessened movement of the higher

grade goods from the east into the northwestern farming areas. It would be difficult to determine exactly the effect on average ton-mile revenue of the transcontinental rate situation. The fact is, of course, that the carriers have not been allowed to charge lower rates to Pacific coast points favored with water transportation than to interior points. To reduce the rates to inland points to the level set by water competition for the Pacific coast points would result in a lower rate level for all traffic than would be feasible. As a result the Pacific coast traffic has been largely lost to the water carriers. The rates on the Pacific coast business were not high but they gave the transcontinental roads much traffic moving west-bound to balance the large lumber traffic moving eastward.

A Comparison of Traffic

The Northern Pacific in 1923 carried 12.50 per cent more revenue tons in 1923 than in 1922 and 13.84 more ton-miles. The number of revenue tons—24,133,001—was the largest in the company's history with the single exception of 1918. The revenue ton-miles, however—6,854 million—were exceeded in many preceding years, including 1916 and every year since with the exception of 1921 and 1922. The year 1920 offers

at the end of 1923 to only 4.63 per cent. The burden embodied in catching up on freight car maintenance is a great one. In 1913 the Northern Pacific's average cost per car for repairs of freight cars was \$67.30; in 1917, \$74.36, and in 1923, \$180.15. The improvement in freight car conditions over a period of years is shown as follows:

| | March 1, 1920 | December 31, 1923 |
|--|------------------|----------------------|
| Cars new or rebuilt within five years..... | 5,272 | 23,615 |
| Cars with steel center sills..... | 18,860 | 21,429 |
| Cars with steel underframes..... | 8,124 | 12,649 |
| Cars with metal roofs..... | 19,094 | 26,645 |
| Cars with steel ends..... | ..... | 4,000 |

At present the company owns 48,376 freight cars with an average carrying capacity of 39.57 tons per car. On December 31, 1920, the ownership totaled 48,729, the average capacity of which was 38.43.

During 1923 the road received 50 new or remodeled locomotives. At the end of the year 714, or 50 per cent, of its total locomotives were equipped with superheaters and 60, or 4.21 per cent, were oil-burning.

It has been pointed out that the principal reason for the increase in operating expenses in 1923 was the increased cost of maintenance. The year's transportation ratio—the per

NORTHERN PACIFIC OPERATING RESULTS—1913-1923

| Year ended June 30 | Mileage | Freight revenues | Total operating revenues | Operating expenses | Net operating revenues | Operating ratio | Revenue tons | Revenue ton-miles | Revenue per ton-mile cents | Revenue train load | Revenue car load |
|--------------------|---------|------------------|--------------------------|--------------------|------------------------|-----------------|--------------|-------------------|----------------------------|--------------------|------------------|
| 1913 | 6,313 | \$52,270,686 | \$72,676,139 | \$44,673,298 | \$28,002,841 | 61.47 | 21,285,527 | 6,232,168,637 | 0.839 | 542 | 19.74 |
| 1914 | 6,353 | 48,058,812 | 68,544,802 | 41,472,053 | 27,082,749 | 60.50 | 20,422,419 | 5,629,351,427 | 0.854 | 567 | 19.64 |
| 1915 | 6,466 | 43,833,637 | 63,171,653 | 37,108,049 | 26,063,604 | 58.74 | 17,625,225 | 5,164,571,432 | 0.849 | 573 | 19.15 |
| 1916 | 6,505 | 55,656,395 | 75,939,231 | 40,366,412 | 35,572,819 | 53.16 | 20,995,693 | 7,017,609,074 | 0.793 | 633 | 20.84 |
| Year ended Dec. 31 | | | | | | | | | | | |
| 1916 | 6,514 | 59,543,090 | 80,281,343 | 43,232,278 | 37,049,065 | 53.85 | 21,893,980 | 7,721,585,793 | 0.771 | 637 | 21.21 |
| 1917 | 6,534 | 65,258,995 | 88,225,726 | 53,297,861 | 34,927,865 | 60.41 | 22,842,151 | 8,812,675,163 | 0.741 | 662 | 23.17 |
| 1918 | 6,566 | 178,534,344 | 102,908,259 | 171,516,302 | 31,391,957 | 69.62 | 24,150,782 | 9,589,272,892 | 0.819 | 737 | 25.40 |
| 1919 | 6,642 | 72,934,723 | 100,739,354 | 76,179,715 | 24,559,639 | 75.91 | 21,389,131 | 7,589,036,420 | 0.961 | 661 | 24.00 |
| 1920 | 6,653 | 81,090,390 | 113,084,408 | 100,983,874 | 12,100,534 | 89.30 | 23,448,182 | 7,852,847,753 | 1.033 | 660 | 24.20 |
| 1921 | 6,658 | 69,246,505 | 94,538,059 | 77,630,867 | 16,907,192 | 82.12 | 17,670,162 | 5,289,784,354 | 1.309 | 595 | 22.02 |
| 1922 | 6,640 | 71,725,006 | 96,076,066 | 72,654,711 | 19,450,514 | 75.62 | 21,451,028 | 6,021,158,972 | 1.191 | 588 | 21.79 |
| 1923 | 6,668 | 77,610,570 | 102,002,060 | 80,364,810 | 17,100,557 | 78.79 | 24,133,001 | 6,854,336,779 | 1.132 | 616 | 22.11 |

a typical comparison. The revenue tons moved in that year were not as great as in 1918, and the ton-miles not as great as in 1917 or 1918. The tons were actually 23,448,182, the ton-miles 7,853 millions. Whereas the average haul in 1923 was 284 miles, in 1920 it was no less than 335. The tonnage of coal, bullion and matte and also of manufactured products in 1923, was much below that of 1920. The tonnage of agricultural products was slightly greater. The movement of products of forests in 1923 was much greater than in any of the three preceding years.

Northern Pacific operating revenues in 1923 totaled \$102,002,060 and exceeded those of 1922 by only 6.17 per cent. The operating revenues per mile were the greatest in the company's history with the single exception of 1920. The 1923 operating expenses totaled \$80,364,810, an increase over 1920 of 10½ per cent. The larger part of the increase in expenses was in connection with maintenance, particularly of equipment. The expenses for conducting transportation increased in 1923 over 1922 only 4.17 per cent. Maintenance of equipment expenses, however, were increased no less than 24.36 per cent. Of the total increase of \$7,710,099 in operating expenses, \$1,196,053 was in maintenance of way and \$4,399,726 in maintenance of equipment. Only \$1,733,789 was in transportation.

Increased Maintenance of Equipment

The increase in expenses for maintenance of equipment is of special interest. It was, of course, practically all in repairs of cars and locomotives. At the beginning of the year the road had 76 per cent of its locomotives in "good" condition and 13 per cent in or awaiting shop. At the end of the year the per cent in good condition had become 82 and the per cent in or awaiting shop had been reduced to 10. Unserviceable cars at the end of 1922 amounted to 9.73 per cent;

cent that transportation expenses bear to total operating revenues—was 37.78. This was the best figure for a seven-year period except 1917, when the C. T. ratio was 32.34 and 1918, when it was 36.44. The average train load in 1923 was 725 tons as compared with 681 tons in 1922. It is unfortunate that the rate situation was such as to prevent this operating economy from being carried on into net income.

The Northern Pacific has expended for additions and betterments during the last seven years no less than \$67,313,427, on which expenditure, as has already been pointed out, there has as yet been practically no net return. The capital expenditures in 1923 totaled \$21,649,738 of which \$2,892,203 was for locomotives and \$11,452,382 for freight cars. There was expended for shop buildings and machinery \$724,861. There was spent for signals \$516,457. By the end of 1924 the company will have automatic block signals on all of its important main lines between the Twin Cities and Puget Sound and Portland. Howard Elliott, chairman of the board at the meeting of the stockholders on April 9, made this significant statement, "Capital expenditures for 1924 will be very much less than in 1923."

THE ASSOCIATION OF NATIONAL ADVERTISERS, at its semi-annual meeting at Cleveland, Ohio, on May 28, resolved that the association record its faith in the principle and practice of private ownership in operation of railroads and other transportation facilities, and that it favor a policy of co-operation on the part of the public and the government; that further expansion and development may be assured as the growing needs of the country require. Earnest disapproval was expressed of the kind of political agitation against the railroads revealed in many recent bills introduced in Congress, and all business men were called upon to adopt a spirit of helpfulness and fair-mindedness toward transportation problems.

Further Proceedings of the Fuel Association

Accounting Committee Recommends a Standard Form for Summarizing Monthly Fuel Performance

AMONG THE PAPERS read and discussed at the sixteenth annual convention of the International Railway Fuel Association, reference to which has not already been made in these columns, were committee reports on Front Ends, Grates and Ash Pans; Fuel Accounting, Distribution and Statistics; Storage Coal; Firing Practice, and Stationary Plant Practice and Individual papers on Oil and Coal as Locomotive Fuel, The Preparation and Inspection of Locomotive Coal, and an Analysis of the report of the United States Coal Commission.

Abstracts of several of the reports and papers and summaries of the discussions of the subjects on the floor of the convention are given below.

Mechanical Draft

There has been for many years a widespread appreciation of the fact that locomotive draft, as ordinarily produced by exhausting the steam through a nozzle, is obtained at an excessive expenditure of power, and that a more efficient means of producing draft offers one of the best avenues for increasing economy in locomotive performance. Various attempts to devise such means have been made during the last 10 years both in this country and abroad.

No form of steam driven engine can get rid of its steam without some back pressure; but there has been a constant and successful attempt to reduce this pressure to a minimum. In good noncondensing stationary reciprocating engine practice, the average back pressure even at high speeds is generally less than one pound per sq. in. In the locomotive, on the other hand, the back pressure at high speeds ranges from 12 to 18 lb. per sq. in. It is obvious that this difference in back pressure in the two instances greatly reduces the net power developed in the cylinders of the locomotive as compared with stationary engines.

Indicator cards taken from a modern Mikado locomotive weighing 284,500 lb., with a maximum tractive force of 54,600 lb. and 26-in. by 32-in. cylinders, show the average back pressure in the cylinders to be 13 lb. per sq. in. when running at 57 per cent cut-off and 26 miles per hour. The horsepower represented by this back pressure at this speed is 302, that is, we could get 302 additional horsepower from the locomotive if the back pressure could be reduced to zero; we are paying therefore in this locomotive 302 hp. for producing the draft under the conditions cited. The draft in this case was 9.3 in. of water and the calculated net power required to move the gases through the engine and out of the front-end is not more than 70 hp. In other words, the exhaust steam jet, for 302 hp. delivered to it, does 70 hp. of work and allows the balance to go to waste. Of course, no draft producing device can act at 100 per cent efficiency, but the efficiency of the jet in this instance is only 23 per cent and we might very reasonably expect to devise some form of mechanical draft which would have a higher efficiency. If, for example, we could devise some form of turbine-driven fan in which the turbine would operate on exhaust steam at say 6 lb. pressure, we could reduce the back pressure to this point and we could increase the mean effective pressure in the cylinders by the difference between 13 lb. and 6 lb. This difference would represent a net gain of 162 hp. in the power delivered by the locomotive. Under the conditions cited the locomotive developed 2,200 hp., to which this gain would add 7.4 per cent.

The opportunity for improving locomotive efficiency offered

by the situation thus briefly reviewed has attracted the attention of various designers during the last 10 years and a number of plans for mechanical draft have been suggested, and some of them have been tried in service. There are presented below descriptions of four of the devices proposed for producing draft in this way. These statements are greatly condensed from much more detailed descriptions published elsewhere. Reference is made in each instance to the complete publication, and those who are especially interested in the subject should not fail to consult the original publication instead of resting upon the meager descriptions here presented. The committee has information concerning one or two additional designs which it is not now at liberty to publish. In all these plans the draft is produced by means of a small fan or blower which is driven by a steam turbine. In some instances the turbine is supplied with live steam and in others with the exhaust steam from the locomotive cylinders. Two of these designs have been experimented with in service; the others, in so far as we can learn, have not been applied at all.

Apparently the first attempt to develop mechanical draft equipment for locomotives was that made by H. B. MacFarland, following the back pressure experiments to which reference has already been made. The tests of his device were first made in 1913 on Santa Fe locomotive No. 1302; and the second application was made in 1914 on a New York Central switching locomotive. Mr. MacFarland described his experiments and his equipment in the discussion of a paper on "Steam Locomotives of Today," presented at the railroad session of the annual meeting of the American Society of Mechanical Engineers* on December 2, 1914.

Frans H. C. Coppus, president, Coppus Engineering Corporation, Worcester, Mass., has proposed a form of blower for producing the draft in locomotives in a paper entitled "The Mechanical Drafting of Locomotives," presented in December, 1922, to the American Society of Mechanical Engineers.

During the winter of 1921-1922, there was placed in service on the Swedish State Railways a remarkable locomotive† designed by Fredrik and Birger Ljungstrom, turbine and power plant manufacturers of Stockholm, in which the usual reciprocating engines are replaced by a turbine exhausting into an air-cooled condenser, the air for combustion is preheated by means of the waste gas, the feed water is heated by the exhaust steam from the auxiliaries and the draft is created by a turbine-driven fan. Its maximum horsepower is 1,500 and maximum drawbar pull 30,000 lb.

In an article entitled Continuous Draft in Locomotives, H. Daubois describes apparatus for producing the draft by means of a turbine-driven fan, after discussing at some length the disadvantages arising from the variable draft pressure caused by the variable steam pressure in the ordinary nozzle. Among these disadvantages, Mr. Daubois does not cite the power losses due to the back pressure in the cylinders and he proposes the use of all the exhaust steam from the cylinders to drive the fan turbine. Although he does not specifically so state, it is probably to be inferred, therefore, that he does not expect to get a very much lower back pressure than is found in the cylinders of the locomotive with the usual draft arrangements. He emphasizes the fact that by thus using the exhaust steam, the speed and the work performed by

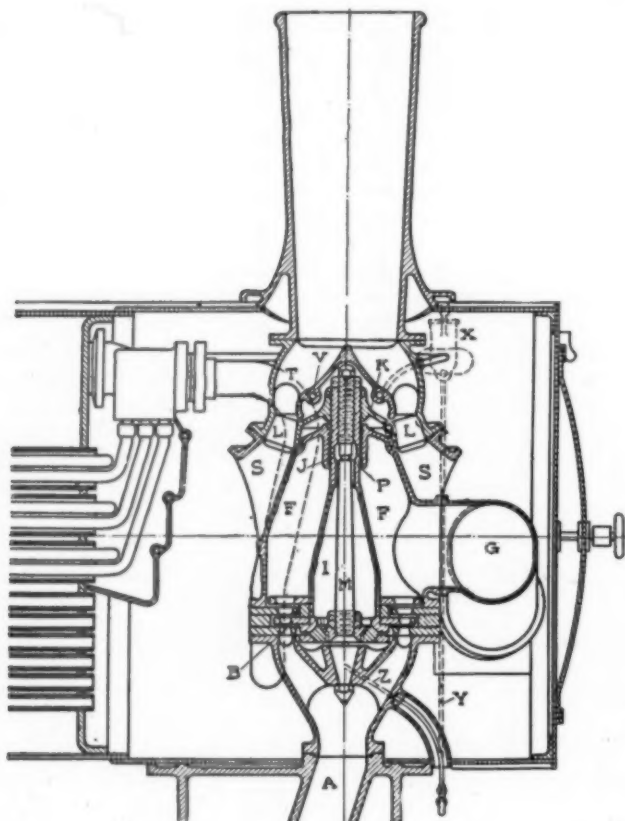
* See the *Railway Age Gazette* for December 18, 1914, page 1119.

† See the *Railway Mechanical Engineer* for July, 1922, page 386; October, 1922, page 557, and November, 1922, page 623.

the fan (and consequently the draft) would vary automatically with the work being performed by the locomotive, as is the case with the ordinary exhaust jet. This device can be applied to existing locomotives without any changes except in the front-end arrangements. It is shown in the illustration.

The exhaust steam reaches the turbine *B* through the passage *A* which is expanded into an annular delivery chamber which feeds the steam over the entire periphery of the turbine. The steam, after passing through the turbine enters the receiving chamber *F*, from which it is exhausted through the pipe *G* either directly to the atmosphere or to a feed water heater, as may be desired.

The rotating parts of the turbine are carried upon the hollow spindle *I*, carrying upon its upper end the hub *K*



Dambois Turbine-Driven Fan for Locomotive Draft

and a helicoidal fan *L*. The fan draws the gases from the smoke box through the openings *S* and discharges them through the guide vanes *T* into the stack. A circular cord passage forms a blower *V* to be used for draft when the fan is at rest. A lubricator *X* located outside the front-end supplies oil, through a pipe *Y* and a passage *Z*, to both the lower and upper bearings.

Since the turbine receives and delivers steam over its entire periphery, it cannot in itself create much, if any, counter pressure in the main exhaust passage and such back pressure as may exist in the cylinders is due to the design of the valves and valve gear. The author proposes that the exhaust steam from the turbine be used in a closed tubular feed water heater with which the ordinary injector may continue to be used. Mr. Daubois makes the following claims for this equipment: "It does not modify the exterior appearance of the locomotive; it does not interfere with the cleaning of the front-end or of the tubes; it improves the efficiency of the boiler by increasing its output and by diminishing its coal consumption; it reduces the effort of the firemen; it

makes the locomotive less noisy; and, finally, it can be easily installed in existing locomotives."

Southern Pacific Oil-Burning Drafting Arrangements

Oil-burning locomotives operated on the Southern Pacific, Pacific system, are equipped with two kinds of front-end draft arrangements; namely, the petticoat pipe and the inside stack arrangements. The inside stack is now adopted as standard; all new locomotives are thus equipped and the older locomotives are equipped with the inside stack on being changed to superheaters.

In the old arrangement the petticoat pipe was made in two sections, the lower part or bell fitting into a straight pipe in order to allow the raising and lowering of both ends of the pipe. The petticoat pipe was designed to draw on both the top and the bottom of the flue sheet. The average height from top of pipe to base of stack is between 4½ in. and 6 in., and from the top of the nozzle, 1 in. The new extension stack which is now being applied to superheater locomotives extends down to about the center line of the boiler, and it is so made that it can be raised or lowered.

Since the locomotives on the Southern Pacific Lines burn oil they have neither grates nor ash pans, but are equipped instead with fire pans which are made in two shapes—the square pan for the vertical draft and the half-round pan for the horizontal draft. In the vertical draft pan the flash hole is placed just forward of the flash wall—as a rule, about five feet from the burner. With this arrangement the incoming current of air from the flash hole strikes the horizontal spray of oil and, thoroughly mixing with it, turns the spray and flame upward just in front of the extremely hot flash wall, where conditions are best for complete combustion.

With the horizontal draft arrangement a half-round fire pan is used. The air openings in this pan are located in the draft sheet on both sides of the burner. On small locomotives draft tubes are used; these tubes are three inches in diameter by six inches long. The horizontal pan has the same opening around the burner as that on the vertical draft, for the purpose of cooling the burner. The air currents to the rear of the firebox are admitted through the fire door. Inside the firebox door is located the deflector, which turns downward the air coming in through the door. This current of air meets and thoroughly mixes with the current of air and vaporized oil coming from the burner at a point just in front of the hot flash wall where conditions are most favorable for combustion. In the horizontal draft arrangement a great deal more atomizer is used in order to force the oil spray back against the incoming current of air through the fire door. The air openings on oil burning locomotives require very close attention, and we do not always find that the locomotive which runs over the line with a perfectly clear stack has the best fuel record. It is good practice to regulate the supply of air until a very light gray haze shows at the stack. Under these conditions excess air is reduced to a minimum and the fuel consumption is kept down.

On a Mikado locomotive burning oil the total air opening with the vertical draft is 290 sq. in., distributed as follows: 30 sq. in. in the burner hole (allowing for the burner), and 260 sq. in. in the flash hole. These openings are for a locomotive with 6½ in. nozzle tip and a half-inch split. As a rule the air openings are regulated by the flue area, taking into consideration also the size of nozzle tip and the water conditions over the district in which the locomotive is to be run.

The following are the members of the committee: Edward C. Schmidt (University of Illinois), chairman; M. C. M. Hatch (M.-K.-T.), V. L. Jones (N. Y., N. H. & H.), G. H. Likert (U. P.), John P. Neff (American Arch Company), C. B. Smith (B. & M.), F. C. Thayer (Southern), G. A. Young (Purdue University) and F. Zeleny (C. B. & Q.).

Discussion

H. C. Woodbridge (Locomotive Stoker Company) in discussing this report referred to the fact that some years ago considerable publicity was given to the results of tests made by the Norfolk & Western on a locomotive equipped with exhaust nozzles of special form, the purpose of which was to break up the periphery of the exhaust jet, and that these results showed a marked improvement in draft efficiency. Mr. Woodbridge raised the question as to why so much attention was being given to mechanical draft appliances which involved the application of more or less complicated devices to the locomotive front-end, when the methods used on the Norfolk & Western apparently produce the same results as the mechanical appliances with no added complications. F. P. Roesch (Standard Stoker Company) called attention to the fact that other railroads have also made similar tests and obtained similar results, and agreed that more attention should be given to the possibilities of these simple means of increasing draft efficiency.

R. S. Twogood (Southern Pacific) expressed the opinion that whatever the means employed, the best results must ultimately be obtained by the elimination of the intermittent type of draft with its resulting intermittent high temperatures which cause leaky tubes and staybolts.

Oil and Coal as Locomotive Fuels

By M. C. M. Hatch

Mechanical Superintendent, Missouri-Kansas-Texas,
Dallas, Tex.

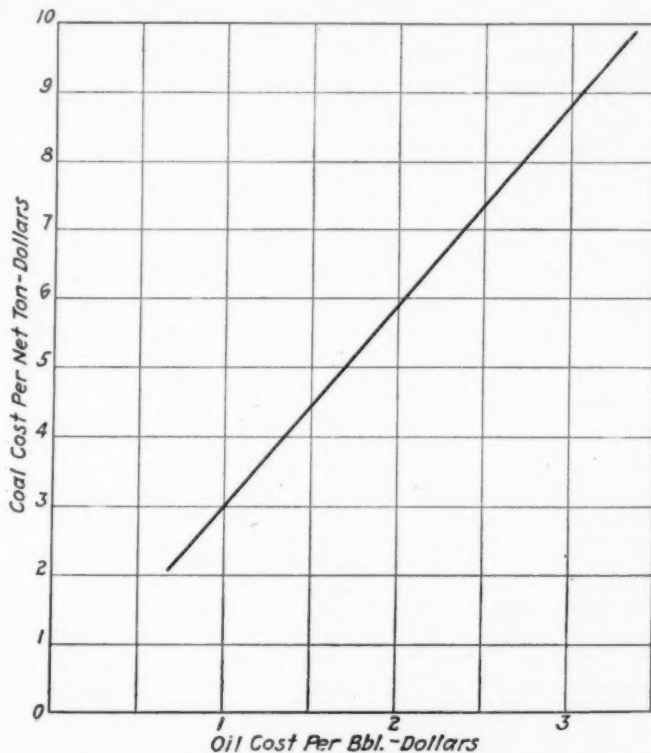
The fuel, whether it be oil or coal, that will give the greatest amount of work at the draw-bar for every dollar expended is the one to use. When we buy a ton of coal or a barrel of oil, the feature of interest is the number of heat units obtained for the money. The average B.t.u. content of bituminous coal used for locomotive fuel is about 12,500 per lb. and for oil this figure is 18,500 per lb. Oil weighs $7\frac{1}{2}$ lb. per gal. and 180 gal. of oil will therefore contain the same number of heat units as one short ton of coal. Relative boiler efficiencies must be taken into account, however, before any such comparison is of value and, from the best test figures available it appears that, with coal, we can look for a combined efficiency of about 62.5 per cent, while with oil this figure becomes 75 per cent. With due consideration of these relative figures the equivalent heat value of 2,000 lb. of coal is the same as that of 150 gal. of oil. The American Railway Association has recommended that, in order to establish a uniform basis for comparison, a standard equivalent figure of 160 gal. to the ton be used.

Locomotive boiler maintenance, when oil fired, has been discussed a great many times and decided opinions expressed to the effect that oil shortens the life of the firebox, other opinions being as strongly stated that this is not the case and that no additional expense need be feared. Personally, I favor the latter view. If we base our figures on the actual work done by the locomotive there will be no appreciable difference in boiler maintenance between oil and coal firing.

The cost of converting from coal to oil burning is influenced by numerous factors and for large modern power the net cost is found to be about \$1,500 a locomotive. It is not easy to determine exactly what will happen to operating costs if oil be substituted for coal. Fewer engines will be needed to handle a given tonnage or the same number can handle a greater tonnage. Locomotives can stay out of the enginehouse a greater proportion of the time and long runs are possible that could not be made with coal. For example, the M.-K.-T. is running large Pacifics through in heavy, fast passenger service from Franklin, Mo., to San Antonio, Tex., a distance of 876 miles, five crews handling the engine.

With this long run in effect for several months, the results attained have been most satisfactory.

For any railroad contemplating the possibility of a change-over from coal to oil or the necessity of changing back from oil to coal, the thing to be determined is the balance in price between the two fuels. With coal at \$5 a ton, on the tender, what price oil per barrel will develop the same amount of work or, with \$1.25 oil how much should one pay for coal before seriously considering a change? The curve shown indicates, in a general way, where this balance will



Curve Showing "Balance" Prices Between Fuel Oil Per Bbl. and Coal Per Net Ton, Both on the Locomotive Tender

fall. This has been calculated on the basis of a careful consideration of all the factors involved. For all practical purposes, this curve shows that when the price of oil per barrel on the tender decreases to less than one-third the price of coal per ton on the tender the changeover from coal to oil or the reverse should be considered. This curve was drawn with due consideration of relative boiler efficiencies, stand-by and other losses.

Report on Accounting, Distribution and Statistics

In order that statistics can be used to advantage, there must be: First, a real need for them; second, they must be reasonably accurate, at least to the extent of showing the actual trend of the factors they profess to cover; and third, they must not be complicated; they must in short be simple and easily understood, containing only the important features which need supervisory attention, or are necessary for the efficient and safe operation of a railroad. Fuel statistics, as furnished by the railroads of this country, for the most part meet the first and second requirements. They do not, unfortunately, always meet the third, and it is with the idea of simplifying fuel statistical data, that this committee has undertaken the standardization of the forms for reporting them.

Appreciating the vast amount of detail work necessary to

proper thing. Do not recommend a reduction in the train load if it develops the engines are not in condition or are not being properly handled. Get at the primary cause and fix it. In the case of Division "D," while the engines are getting over the road on this division with an increased train load and increased ton-miles per hour, the increase in the fuel unit would indicate that apparently, (a) they are running at excessive speed for the train load, (b) there is poor firing or handling of the engines, (c) improper lubrication, minor mechanical troubles, such as defective grates or arches, or, too large a nozzle, or (d) inferior fuel. All of which, while possibly not interfering with the train load or increasing the time on the road is resulting in waste of fuel. On this division, engines will have to be extensively inspected or ridden to determine the cause definitely. This increase in the fuel unit with an increase in train load could also be caused by a radical change in the method of operation, or the type of power used in the two periods compared.

The committee wishes to emphasize the fact that this form is not intended to replace any daily, weekly, semi-monthly or individual fuel performance reports now in use, but is intended as a monthly summary to replace all monthly reports, now going to officers below the rank of general superintendent, with the exception of the monthly report of performance of individual locomotives and enginemen. The committee claims for this report that it has all the information necessary to point out *what* is wrong. Finding out *where* the trouble is will be the function of the officer whose division or district shows a loss in fuel efficiency, and this he can easily do with the detailed reports furnished him daily, weekly, or semi-monthly according to the practice followed on his particular railroad.

The committee directs the attention of this association to the excellent statistical data furnished by the Bureau of Railway Economics on form O. S. Ser. C., a copy of which is sent to the railroad executives. We urge the wider study of this data by railroad officers. This information is not being given as wide circulation among the rank and file of operating officers and train service employees that its importance justifies, and would recommend that the matter be taken up with the bureau with a view of having fuel performance data and certain operating factors, covering all Class I railroads in the United States, printed in suitable form each month, sufficient copies being made for each railroad to enable them to post a copy on each bulletin board for the information and guidance of the officers and men. We would recommend that the report show the following information for each of the railroads covered:

FREIGHT SERVICE

- (1) Gross ton miles in millions (including locomotive and tender).
- (2) Net tons of fuel consumed.
- (3) Lb. fuel per 1,000 ton miles (including locomotive and tender).
- (4) Gross ton per train.
- (5) Gross ton miles per train hour (excluding locomotive and tender).
- (6) Train speed (miles per train hour).
- (7) Gross ton miles in 1,000's (excluding locomotive and tender).

PASSENGER SERVICE

- (8) Passenger train car miles in 1,000's.
- (9) Net tons fuel consumed.
- (10) Pounds fuel per passenger train car mile.

The report was signed by B. A. McDowell (B. & O.), chairman; D. I. Bergin (Wabash), R. R. Hibben (M.-K.-T.), R. E. Jones (D. & I. R.), J. McCabe (N. Y., N. H. & H.), Hugh McVeagh (C. C. C. & St. L.), C. F. Needham (C. N.), J. M. Nicholson (A. T. & S. F.), Heister Piollet (L. V.), C. S. Pond (S. P.), G. G. Ritchie (C. & O.), W. J. Tapp (D. & R. G. W.), E. H. Titgen (M.-K.-T.), and J. J. Tobin (B. & M.).

Discussion

The work done by this committee and the results attained as formulated in the report were highly commended by the members of the association, a number of whom expressed the opinion that the report was a real contribution to progress

in the development of control statistics. A question was raised as to why ton-miles per train-hour was not used as a unit for measuring coal consumption. Mr. McDowell, in closing, said that gross ton-miles per locomotive-hour is a good statistician's unit of performance, but that to measure coal per ton-mile hour would involve two factors of a contradictory nature, the ton-miles being in the nature of a credit, and the hours spent in the nature of a debit. Another question was raised as to why the committee included the weight of locomotive and tender in its suggestions as to what the Bureau of Railway Economics' reports should contain, it being pointed out that this breaks the comparability with figures previously used, in which the weight of the locomotive and tender was not included. Mr. McDowell indicated that the committee had no preference as to which of these units were used and would consider the matter further.

Rate Readjustment

Resolution Fails

WASHINGTON, D. C.

CONGRESS ADJOURNED on June 7, in accordance with the resolution adopted earlier in the week, after having kept its hands off the transportation act with the exception of one amendment to the interstate commerce act as it was amended by the transportation act in 1920, affecting paragraph 3 of section 16, to allow shippers three years, instead of two years, in which to file complaints for the recovery of overcharges. This was done in order to make the time allowed shippers correspond with that allowed railroads to institute proceedings for the recovery of undercharges.

Even the one piece of important railroad legislation that was generally expected to pass failed in the Senate on the last day. This was the Hoch-Smith resolution directing the Interstate Commerce Commission to make a thorough investigation and readjustment of the rate structure and to give products of agriculture affected by the depression, including livestock, "the lowest possible reasonable and lawful rates compatible with the maintenance of adequate transportation service." This was passed by the House on June 6 by a vote of 139 to 8, in the form of the Hoch resolution as it had been reported by the committee on interstate commerce, with an additional paragraph rewritten from the Smith resolution as it had previously been passed by the Senate. It had been reported that an understanding had been reached that the Senate would pass the combination resolution as it came from the House in place of its own, but when the Senate opened on June 7 Senator Smith moved that the Senate disagree to the amendments of the House and ask for a conference. The conferees agreed on some slight changes and their report was adopted by the House by a vote of 170 to 13, but the Senate got into a jam just before adjournment, when Senator Pittman held up the deficiency appropriation bill because it did not include an item for an irrigation project in his state, and the conference report on the rate resolution was not reached.

The deficiency bill which was thus balked of passage in the Senate included the additional appropriation of \$350,000 for the valuation work of the Interstate Commerce Commission, intended to enable it to expedite the valuations of roads whose earnings are believed to be near the recapture point. The bill carrying the regular appropriations for the Interstate Commerce Commission, including \$647,260 for valuation, for the fiscal year 1925, was passed and was signed by the President. The Senate on June 7 passed the bill introduced by Representative Cooper of Ohio, H.R. 8578,

which had earlier passed the House, providing for the employment by the commission of 15 additional locomotive inspectors and increases in the salaries of the inspectors and the chief and assistant chief inspectors.

Labor Bill on Calendar for Next Session

The Senate committee on June 6 favorably reported to the Senate the Howell labor bill with an amendment authorizing the President in case of an emergency threatening an interruption of transportation to appoint a fact-finding commission, composed of a representative of the Interstate Commerce Commission, the secretary of commerce and three others, to make a public report. The committee had voted to report the bill on May 31, but there was a delay in drafting the amendment and after the bill had been withdrawn in the House there was less hurry to get the bill before the Senate. This bill is therefore on the calendar of both houses for consideration at the next session.

Bills passed by the Senate but not by the House which may be taken up by the House at the next session are the two steel car bills, the Pullman surcharge bill and the Gooding fourth section bill.

The Gooding resolution for the investigation of railroad propaganda did not reach the stage of a final vote in the Senate.

The bill introduced by Senator Copeland of New York, similar to that introduced in the House by Representative Snyder, to provide a penalty of \$1,000 a day for any railroad that does not comply with an order of the Interstate Commerce Commission requiring the installation of automatic train control, was reported out of the Senate committee on interstate commerce on the last day of the session by Chairman Smith with an amendment, but was not considered. Representative Snyder during the day also introduced another bill on the subject, H.R. 9773.

The President has signed the bill providing for an investigation of the Northern Pacific land grants but an appropriation of \$50,000 for the expenses of the investigation was included in the deficiency appropriation bill which failed. The President has also signed the bill for the creation of the Inland Waterways Corporation.

The Hoch Resolution

It is understood that one of the main objects of the Hoch resolution was to influence the Interstate Commerce Commission in the decision of the Kansas grain rate case, which has been pending before the commission for a long time and on which some of those particularly interested are looking for a decision before the members of the commission depart on their vacations. However, the resolution or at least its general idea was supported by some of those who believe in a general overhauling of the rate structure, such as Secretary Hoover, and it was in general accord with a recommendation made by President Coolidge in his address to Congress in December.

The resolution was passed in the House with comparatively little debate. Representative Hoch said he did not claim it was "a panacea or anything of that sort" but that he was firmly convinced that a study would show that rates on farm products in many cases ought to be reduced. He added that it does not "contemplate that there shall be anything ruthless done." Representative Huddleston, who has been an advocate of a repeal of section 15a, opposed the resolution on the ground that it might result in some undesired increases in rates. Representative R. Walton Moore, of Virginia, said he would vote for it for "the alleged possibilities it contains," but that he did not want the republican party credited with taking a course which holds out any probability of relief, and referred to it as not "much better than a mere gesture." Representative Shallenberger of Nebraska, who had filed a petition to discharge the House committee from consideration of a bill to repeal 15a, opposed

the resolution as a "lemon" for the farmers, saying that the way to give relief to the farmer is not by investigation by a commission but by repeal of the law "that authorizes and directs the commission to levy excessive charges." However, he figured that he had discovered one way to get some rates reduced. He is a breeder of pure-bred livestock in Nebraska and he said that ten days after his motion had been signed by 40 members of the House five of the principal railroads of his state had voluntarily asked permission of the Nebraska state commission to reduce the state rates on pure-bred livestock by 50 per cent. He also read a telegram from the chairman of the state commission expressing the opinion that the rates could not have been ordered by the state commission because they are probably lower than reasonable per se.

Text of the Resolution

The text of the resolution as finally formulated by the conferees and adopted in the House contained more of the language of the Smith resolution than was included as it passed the House, declaring it to be the true principle in rate-making that conditions prevailing at any given time in the several industries should be considered. The conferees also struck out the word "reasonable" as one of the words qualifying the rates to be made for the benefit of agriculture. The text is as follows:

"That it is hereby declared to be the true policy in rate making to be pursued by the Interstate Commerce Commission in adjusting freight rates, that the conditions which at any given time prevail in our several industries should be considered in so far as it is legally possible to do so, to the end that commodities may freely move.

"That the Interstate Commerce Commission is authorized and directed to make a thorough investigation of the rate structure of common carriers subject to the interstate commerce act, in order to determine to what extent and in what manner existing rates and charges may be unjust, unreasonable, unjustly discriminatory, or unduly preferential, thereby imposing undue burdens, or giving undue advantage as between the various localities and parts of the country, the various classes of traffic, and the various classes and kinds of commodities, and to make, in accordance with law, such changes, adjustments, and redistribution of rates and charges as may be found necessary to correct any defects so found to exist. In making any such change, adjustment, or redistribution the commission shall give due regard, among other factors, to the general and comparative levels in market value of the various classes and kinds of commodities as indicated over a reasonable period of years, to a natural and proper development of the country as a whole, and to the maintenance of an adequate system of transportation. In the progress of such investigation the commission shall, from time to time, and as expeditiously as possible, make such decisions and orders as it may find to be necessary or appropriate upon the record then made in order to place the rates upon designated classes of traffic upon a just and reasonable basis with relation to other rates. Such investigation shall be conducted with due regard to other investigations or proceedings affecting rate adjustments which may be pending before the commission.

"In view of the existing depression in agriculture, the commission is hereby directed to effect with the least practicable delay such lawful changes in the rate structure of the country as will promote the freedom of movement by common carriers of the products of agriculture affected by that depression, including livestock, at the lowest possible lawful rates compatible with the maintenance of adequate transportation service: *Provided*, That no investigation or proceeding resulting from the adoption of this resolution shall be permitted to delay the decision of cases now pending before the commission involving rates on products of agriculture, and that such cases shall be decided in accordance with this resolution."

The Progressive Publicity Bureau, established by the Conference for Progressive Political Action, has issued a statement that "already the response of the country to the abandonment by Congress of further discussion of farm relief and railroad legislation is seen in a flood of requests for credentials to the July 4 convention," to be held at Cleveland. It having been "proven that a balance of power in Congress is not enough to secure constructive legislation," the statements says, "the issue is now the election of a majority in Congress." A list of what the conference stands for includes "the repeal of the Esch-Cummins act, and public ownership of railroads with democratic operation."

Fluctuations in the Number of Railway Clerks*

Increase Greater Than for Other Employees But Not Out of Proportion to Freight Ton-Miles

INTEREST IN THE number of clerks employed by railroads has been stimulated by the assertion made from time to time that railroads are forced by governmental authorities to do much needless clerical work. The present paper gives the results of a study of the growth in the number of railway clerks and of the comparative number of clerks on the various individual large railroads with the purpose of throwing some light on the causes of variations in clerical forces as far as it can be done from available statistics.

An accurate statement covering a long period of years of the number of clerks employed by railroads cannot be given because of changes in the classification of employees in the annual reports of the carriers. Each new classification was an improvement over its predecessor but comparability was impaired by the change. The figures actually shown in the published reports are as follows, except that an allowance has been made for roads that did not furnish information regarding employees in 1915. The figures have not been adjusted to make the total for every year cover all classes of roads as was the case prior to 1908, but this is not important.

Before 1915 the count of employees was as of a single date, June 30. The difference between the first and second classifications is so wide that it may be useless to attempt to put them on a comparable basis. However, the following experiment may be of interest. There probably was no radical change in the number of clerks from the year 1914 to the next year, 1915, and we may assume that the difference shown in the table for these two years is principally the result of the change in the classification. It is necessary to raise the 1914 figure 79.10383 per cent to produce the 1915 figure. To the extent that the number of general office clerks was actually less in 1915 (fiscal year) than in 1914

on account of the recession of business activity as compared with 1914, the percentage chosen would be too large, but as the recession in business was small, the error is probably very small. This percentage has been applied and added

TABLE I.
Number of clerks as reported, 1889-1923.

| Date or period | 1st Classification (General Office Clerk) | 2nd Classification | 3rd Classification (Reporting Divisions 7-14 inclusive) |
|----------------------------|--|-----------------------|---|
| June 30, 1889 | 20,817 | ..... | ..... |
| 1890 | 22,239 | ..... | ..... |
| 1891 | 23,879 | ..... | ..... |
| 1892 | 25,469 | ..... | ..... |
| 1893 | 27,584 | ..... | ..... |
| 1894 | 24,779 | ..... | ..... |
| 1895 | 26,583 | ..... | ..... |
| 1896 | 26,328 | ..... | ..... |
| 1897 | 26,337 | ..... | ..... |
| 1898 | 26,845 | ..... | ..... |
| 1899 | 29,371 | ..... | ..... |
| 1900 | 32,265 | ..... | ..... |
| 1901 | 34,778 | ..... | ..... |
| 1902 | 37,570 | ..... | ..... |
| 1903 | 42,218 | ..... | ..... |
| 1904 | 46,037 | ..... | ..... |
| 1905 | 51,284 | ..... | ..... |
| 1906 | 57,210 | ..... | ..... |
| 1907 | 65,700 | ..... | ..... |
| 1908 | 63,973 | ..... | ..... |
| 1909 | 69,959 | ..... | ..... |
| 1910 | 76,329 | ..... | ..... |
| 1911 | 76,513 | ..... | ..... |
| 1912 | 78,818 | ..... | ..... |
| 1913 | (a) 84,267 | ..... | ..... |
| 1914 | (a) 86,528 | ..... | ..... |
| Fiscal year average { 1915 | ..... | (a) 154,975 | ..... |
| 1916 | ..... | (a) 164,860 | ..... |
| 1917 | ..... | (a) 169,206 | ..... |
| 1918 | ..... | (b) 184,063 | ..... |
| 1919 | ..... | (b) 206,138 | ..... |
| 1920 | ..... | (b) 221,109 | ..... |
| 1921 | ..... | (b) 237,049 | ..... |
| 1922 | ..... | (c) 221,251 | ..... |
| 1923 | ..... | ..... | (c) 214,672 |
| | | | (c) 210,110 |
| | | | (c) 223,332 |

(a) Classes I and II.
(b) Class I only.
(c) Class I and Class I switching and terminal companies.

*A statement prepared by the Bureau of Statistics, Interstate Commerce Commission.

TABLE II.

Number of clerks, adjusted, 1889-1923, in comparison with traffic and total number of employees.

| Date or year | Roads included | Number of clerks adjusted | Transportation service | | Total number of employees | Clerks per | | Per cent clerks of total number |
|---------------|--------------------------------|---------------------------------|------------------------|------------------------|---------------------------------|----------------------|--------------------------|--|
| | | | Car-miles (million) | Ton-miles (million) | | Million car-miles | Ten million ton-miles | |
| June 30, 1889 | All operating | 37,284 | ..... | 68,727 | 704,743 | ..... | 5.42 | 5.3 |
| 1890 | All operating | 39,831 | ..... | 67,207 | 749,301 | ..... | 5.23 | 5.3 |
| 1891 | All operating | 42,768 | ..... | 81,074 | 784,285 | ..... | 5.28 | 5.5 |
| 1892 | All operating | 45,616 | ..... | 88,241 | 821,415 | ..... | 5.17 | 5.6 |
| 1893 | All operating | 49,404 | ..... | 93,588 | 873,602 | ..... | 5.28 | 5.7 |
| 1894 | All operating | 44,380 | ..... | 80,335 | 779,608 | ..... | 5.52 | 5.7 |
| 1895 | All operating | 47,611 | ..... | 85,228 | 785,034 | ..... | 5.59 | 6.1 |
| 1896 | All operating | 47,154 | ..... | 95,328 | 826,620 | ..... | 4.95 | 5.7 |
| 1897 | All operating | 48,066 | ..... | 95,139 | 823,476 | ..... | 5.05 | 5.8 |
| 1898 | All operating | 48,080 | ..... | 114,078 | 874,558 | ..... | 4.21 | 5.5 |
| 1899 | All operating | 52,605 | ..... | 123,667 | 928,924 | ..... | 4.25 | 5.7 |
| 1900 | All operating | 57,788 | ..... | 141,597 | 1,017,653 | ..... | 4.08 | 5.7 |
| 1901 | All operating | 62,289 | ..... | 147,077 | 1,071,169 | ..... | 4.24 | 5.8 |
| 1902 | All operating | 67,289 | ..... | 157,289 | 1,189,315 | ..... | 4.28 | 5.7 |
| 1903 | All operating | 75,614 | ..... | 173,221 | 1,312,537 | ..... | 4.37 | 5.8 |
| 1904 | All operating | 82,454 | ..... | 174,522 | 1,296,121 | ..... | 4.72 | 6.4 |
| 1905 | All operating | 91,852 | ..... | 186,463 | 1,382,196 | ..... | 4.93 | 6.6 |
| 1906 | All operating | 102,465 | ..... | 215,878 | 1,521,355 | ..... | 4.75 | 6.7 |
| 1907 | All operating | 117,671 | ..... | 236,601 | 1,672,074 | ..... | 4.97 | 7.0 |
| 1908 | Excl. S. and T. | 114,578 | 19,573 | 218,382 | 1,436,275 | 5.85 | 5.25 | 8.0 |
| 1909 | Excl. S. and T. | 125,299 | 19,928 | 218,803 | 1,502,823 | 6.29 | 5.73 | 8.3 |
| 1910 | Excl. S. and T. | 136,708 | 21,992 | 255,017 | 1,699,420 | 6.22 | 5.36 | 8.0 |
| 1911 | Excl. S. and T. | 137,038 | 22,466 | 253,784 | 1,669,809 | 6.10 | 5.40 | 8.2 |
| 1912 | Excl. S. and T. | 141,166 | 22,715 | 264,081 | 1,716,380 | 6.21 | 5.35 | 8.2 |
| 1913 | Excl. S. and T. and Class III. | 150,925 | 24,369 | 301,399 | 1,815,239 | 6.19 | 5.01 | 8.3 |
| 1914 | Excl. S. and T. and Class III. | 154,975 | 24,202 | 288,320 | 1,695,483 | 6.40 | 5.38 | 9.1 |
| 1915 | Excl. S. and T. and Class III. | 154,975 | 23,604 | 276,830 | 1,534,875 | 6.57 | 5.60 | 10.1 |
| 1916 | Excl. S. and T. and Class III. | 164,860 | 26,300 | 343,100 | 1,641,857 | 6.27 | 4.81 | 10.0 |
| Dec. 31, 1916 | Excl. S. and T. and Class III. | 169,206 | 26,994 | 365,772 | 1,688,244 | 6.27 | 4.63 | 10.0 |
| 1917 | Class I | 184,063 | 26,840 | 394,465 | 1,732,876 | 6.86 | 4.67 | 10.6 |
| 1918 | Class I | 206,138 | 26,115 | 405,379 | 1,841,575 | 7.89 | 5.09 | 11.2 |
| 1919 | Class I | 221,109 | 24,873 | 364,293 | 1,913,422 | 8.89 | 6.07 | 11.6 |
| 1920 | Class I | 237,049 | 26,883 | 410,306 | 2,022,832 | 8.82 | 5.78 | 11.7 |
| 1921 | Class I | (a) 214,873 | 23,877 | 306,840 | (a) 1,681,527 | 9.00 | 7.00 | 12.8 |
| 1922 | Class I | (a) 204,065 | 24,823 | 339,285 | (a) 1,645,244 | 8.22 | 6.01 | 12.4 |
| 1923 | Class I | (a) 216,907 | 28,569 | 413,562 | (a) 1,879,770 | 7.59 | 5.24 | 11.5 |

(a) Includes Class I switching and terminal companies.

to the figure shown each year back to 1889. The third classification did not greatly affect comparability in the aggregate number of clerks. This classification was introduced July 1, 1921. The number of clerks reported for the middle of June of the year 1921 was 207,443 and for the month of July, 213,588. This would imply that the effect of the classification was to increase the number of clerks by 2.9622 per cent although there may have been that much change in the actual number. The published figures for 1921 (last half), 1922 and 1923, have been decreased by 2.8770 per cent. The resulting figures together with a comparison of total car-miles and ton-miles in transportation service are shown in Table II.

Clerks Increase in Other Industries

Table II indicates that there has been a rapid growth in the clerical forces of the railways of the United States. The number of clerks per ten million ton-miles is substantially the same in 1889 and in 1923, while the number of clerks reported per hundred persons employed by the railways has increased markedly. This development is not peculiar to the railroad industry. From the table below, comparing the growth in the numbers employed in 1920 and 1910 in various occupations, it will be seen that the percentage of increase in the number of clerks and stenographers is markedly in excess of that of all other occupations.

TABLE III

Persons ten years of age and over engaged in each specified occupation, for the United States, 1920 and 1910

| | 1920 (Thou- sands) | 1910 (Thou- sands) | Per cent of increase 1920 over 1910 |
|--|--------------------------|--------------------------|---|
| All occupations | 41,614 | 38,167 | 9.0 |
| Agriculture, forestry and animal husbandry* | 10,953 | 12,659 | d13.5 |
| Extraction of minerals* | 1,090 | 965 | 13.0 |
| Manufacturing and mechanical* | 12,819 | 10,629 | 20.6 |
| Transportation* | 3,064 | 2,637 | 16.2 |
| Trade* | 4,243 | 3,615 | 17.4 |
| Public service (not elsewhere classified)* | 770 | 459 | 67.8 |
| Professional service* | 2,144 | 1,693 | 26.6 |
| Domestic and personal service* | 3,405 | 3,773 | d9.8 |
| Clerical occupations: | | | |
| Agents, canvassers and collectors..... | 176 | 105 | 67.6 |
| Bookkeepers, cashiers and accountants.. | 735 | 487 | 50.9 |
| Clerks (except clerks in stores)..... | 1,488 | 720 | 106.7 |
| Messengers, bundle and office boys (ex- cept telegraph messengers)..... | 113 | 108 | 4.6 |
| Stenographers and typists..... | 615 | 316 | 94.6 |

*Except persons shown under "clerical occupations."
d Decrease.

Conclusions of Railway Accounting

Officers' Association Committee

A committee of the Railway Accounting Officers' Association made a report on the subject of the increases in the clerical forces of the railroads and summarized the causes as follows:

In addition to the increases in business and the standard reports and requirements of federal and state commissions, increases in clerical forces are due, in part, to—

(a) Decreased hours of service. In 1920, eight hours was established as a day's work.

(b) Larger proportion of women employed.

(c) The growth of systems which made necessary statistical aids to effective supervision. When there were a thousand small roads instead of two hundred large ones, many supervising officers depended entirely upon their personal knowledge of the situation. Staff organizations have now been developed on practically every operating division.

(d) The large increase in density of traffic. On almost all railroads it will be found that the growth of the railroad plant did not keep pace with the increase in business, thus requiring more intensive use of the facilities.

(e) Demands of the shipping and traveling public for better service, involving more complete information as to rates, shipping conditions and deliveries, and prompt advice as to location of cars.

(f) The more general exchange of facilities and the joint use of properties involving records upon which charges may be computed.

(g) Increased interchange of equipment, requiring large forces on line as well as in the general offices to make bills against foreign roads and check foreign roads' bills for car repairs and to

make car-repair and defect cards, as well as increases in the car accounting department making and checking per diem bills.

(h) General horizontal changes in freight rates, causing new complete sets of tariffs to be issued, in addition to requiring larger forces at stations and in the general offices, rating and revising waybills, as well as clerical forces to take care of increased number of overcharge claims brought about by complications of freight tariffs.

(i) The constant pressure for greater economy in operation which to be made effective required the assembling of data on which judgment could be based and action taken. Witness: fuel tests, service records of locomotives and cars, train earnings reports, performance sheets, etc., now in general use.

(j) Timekeeping. The complexity of timekeeping, under present conditions, has increased the clerical forces for this class of work from two to four hundred per cent. This complication arises from horizontal percentage increases in pay granted by the Railroad Administration and further horizontal increases and decreases established by the Railroad Labor Board, together with the technical and intricate changes in working conditions. Timekeeping, under present conditions, with the many complicated rates, has become a science, whereas in the years prior to federal control simple rates were used and the working conditions were not complicated by technical agreements with labor organizations. This class of clerical forces, as well as the clerical forces in the treasury and paymaster's departments, have been largely increased by semi-monthly and weekly pay days, established in many instances by state laws.

(k) Exactions of financial agencies. In the period under consideration the railroads have more than doubled their outstanding funded debt. In connection with these matters, more detailed information is now required.

(l) Special hearings before state and federal regulatory bodies, and special questionnaires sent out by them. *Federal and state laws and rules of regulating bodies cover every phase of railroad operation. Some of these are in the public interest, while others are of doubtful value.

(m) Increased forces account of requirements by Internal Revenue Department in connection with income, capital stock and

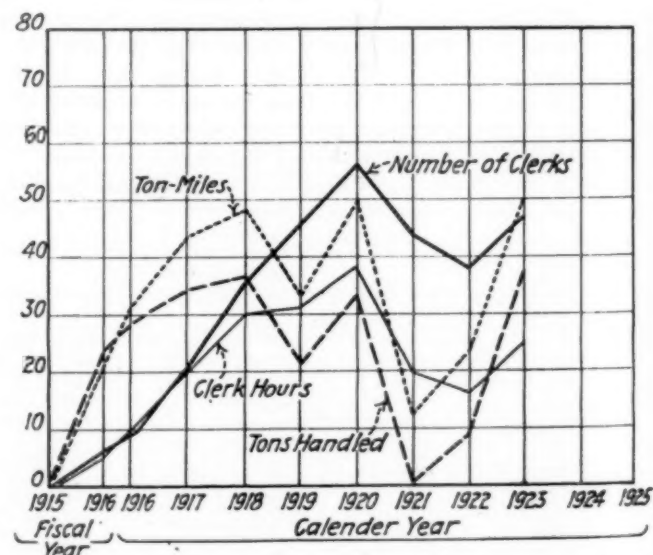


Chart No. 1—Comparison of Clerical Forces and Traffic. Per Cent Increase Since 1915. Class I Steam Roads

other taxes. More than 1,500,000 of forms 1099 (report of total wages or salary of each employee) are submitted annually.

Most of these alleged causes cannot be tested from any available statistics, but it is of interest to note that the effect of traffic volume and the introduction of the eight-hour day is revealed by the statistics.

Clerks, Clerk-Hours and Traffic Increases Compared

Table IV and accompanying diagram show the index number for number of clerks, clerk-hours, tons, and ton-miles with 1915 taken as the base, or 100 per cent. It will be observed that from 1915 to 1918, the number of clerks and hours rose rapidly but not as rapidly as the traffic. The 1919 slackening in business caused a halt in the growth in clerk-

hours, but more clerks had to be employed on account of the eight-hour day. All curves reach a peak in 1920 with the number of clerks showing a more rapid increase than the traffic, the clerk-hours falling between the tons and ton-miles. Evidently the extra accounting incident to the complicated financial relations with the government had an influence in increased clerical work. In 1921 all curves move down. In 1922 the clerks and clerk-hours, now substantially parallel, continued to move down in spite of the increase in traffic. This indicates that the extra accounting work resulting from federal control and guaranty periods was being

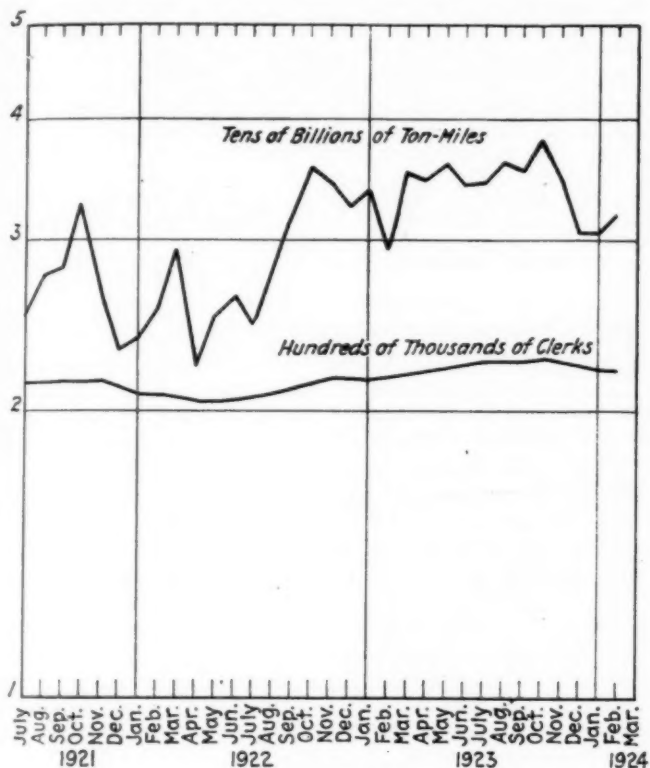


Chart No. 2

cleared up. In 1923 the large traffic increase necessitated some increase in clerical forces.

TABLE IV

Number of clerks, clerk-hours, tons and ton-miles, 1915-1923, Class I steam roads in the United States

| Year ended | Number of clerks | | Clerk hours | |
|--------------------|------------------|-------------------------------------|--------------------|-------------------------------------|
| | Number | Relative number (1915 taken as 100) | Number (Thousands) | Relative number (1915 taken as 100) |
| | | | | |
| June 30, 1915..... | (a) 151,911 | 100.00 | (a) 432,482 | 100.00 |
| 1916..... | 162,151 | 106.74 | 455,761 | 105.38 |
| Dec. 31, 1916..... | 166,500 | 109.60 | 475,322 | 109.91 |
| 1917..... | 184,063 | 121.17 | 523,519 | 121.05 |
| 1918..... | 206,138 | 135.70 | 563,626 | 130.32 |
| 1919..... | 221,109 | 145.55 | 567,202 | 131.15 |
| 1920..... | 237,049 | 156.04 | 598,395 | 138.36 |
| 1921..... | (b) 217,962 | 143.48 | (c) 517,717 | 119.71 |
| 1922..... | (b) 210,110 | 138.31 | (c) 504,584 | 116.67 |
| 1923..... | (b) 223,332 | 147.02 | (c) 538,619 | 124.54 |

| Year ended | Revenue tons carried* | | Revenue ton-miles | |
|--------------------|-----------------------|-------------------------------------|-------------------|-------------------------------------|
| | Number (Thousands) | Relative number (1915 taken as 100) | Number (Millions) | Relative number (1915 taken as 100) |
| | | | | |
| June 30, 1915..... | 1,684,660 | 100.00 | 273,913 | 100.00 |
| 1916..... | 2,093,093 | 124.24 | 339,870 | 124.08 |
| Dec. 31, 1916..... | 2,179,696 | 129.38 | 362,444 | 132.32 |
| 1917..... | 2,270,035 | 134.75 | 394,465 | 144.01 |
| 1918..... | 2,307,226 | 136.96 | 405,379 | 148.00 |
| 1919..... | 2,044,392 | 121.35 | 364,293 | 133.00 |
| 1920..... | 2,259,983 | 134.15 | 410,306 | 149.79 |
| 1921..... | 1,690,763 | 100.36 | 306,840 | 112.02 |
| 1922..... | 1,840,995 | 109.28 | 339,285 | 123.87 |
| 1923..... | 2,312,200 | 137.25 | 413,562 | 150.98 |

(a) Adjusted to include reports of ten roads not included in 1915 text.

(b) Includes Class I switching and terminal companies.

(c) Eight hour day used.

*Table 26 plus unassigned.

A reasonable conclusion is that although fluctuations in clerical expense are by no means solely the result of changes in traffic volume, this is clearly an important cause.

The more shipments, the more bills and other accounting, the more wage records, car records, and other records, and assuming the same method of doing the work, the effect must be to increase the number of clerks.

Table IV-A and Chart No. 2 indicate that there is some variation in the number of clerks due to seasonal influences, though it is not large.

TABLE IV-A

Number of clerks and ton-miles, by months, 1921-1924

| Month | Number of clerks | | | | Number of ton-miles (billions) | | | |
|----------------|------------------|---------|---------|------|--------------------------------|------|------|------|
| | 1921 | 1922 | 1923 | 1924 | 1921 | 1922 | 1923 | 1924 |
| January..... | 208,903 | 217,858 | 220,735 | ... | 23.7 | 33.9 | 30.6 | ... |
| February..... | 207,700 | 217,977 | 220,222 | ... | 25.5 | 29.4 | 32.1 | ... |
| March..... | 207,089 | 219,690 | ... | ... | 29.5 | 35.3 | ... | ... |
| April..... | 205,389 | 220,722 | ... | ... | 22.3 | 34.8 | ... | ... |
| May..... | 205,485 | 222,559 | ... | ... | 25.1 | 36.0 | ... | ... |
| June..... | 206,747 | 224,228 | ... | ... | 26.5 | 34.2 | ... | ... |
| July..... | 213,588 | 208,096 | 225,178 | ... | 25.4 | 24.7 | 34.5 | ... |
| August..... | 214,075 | 209,216 | 226,509 | ... | 27.5 | 27.9 | 36.2 | ... |
| September..... | 214,537 | 212,331 | 226,507 | ... | 27.8 | 31.6 | 35.5 | ... |
| October..... | 215,813 | 213,300 | 227,576 | ... | 32.6 | 36.0 | 38.3 | ... |
| November..... | 216,294 | 217,484 | 226,242 | ... | 26.9 | 35.7 | 34.8 | ... |
| December..... | 213,732 | 217,761 | 223,929 | ... | 23.3 | 32.8 | 30.6 | ... |

The peak in the number of clerks follows the peak in the number of ton-miles. It is obvious from this chart that the general trend in the volume of traffic materially affects the number of clerks.

Women Clerks

It has been suggested that the increase in the number of women employed as railway clerks has affected the increase in the number of clerks. The data on this subject at our disposal are limited. The following table was taken from a study made by the commission in 1920:

| District | Number of women in clerical positions | | Per cent of clerical positions filled by women | |
|--------------------|---------------------------------------|--------|--|---------------|
| | 1919 | 1920 | 1919 Per cent | 1920 Per cent |
| Eastern..... | 36,843 | 34,719 | 33.67 | 29.61 |
| Southern..... | 7,835 | 9,579 | 22.78 | 25.69 |
| Western..... | 23,336 | 25,019 | 31.15 | 30.32 |
| United States..... | 68,014 | 69,317 | 31.10 | 29.24 |

Figures by Regions

We turn now to a comparison of the number of clerks in various districts and by railroads. The following table shows the number of clerks in comparison with ton-miles and passenger-miles in each district. It is apparent that the coal traffic of the Pocahontas Region requires less clerical work per unit of traffic. Excluding the Pocahontas Region, the three districts are remarkably similar in the number of ton-miles per clerk, indicating that the density of traffic does not bring with it economies in clerical work. Density of traffic helps to fill the cars and increase the train load, but every waybill requires individual attention whether there are 100 or 1,000 per mile of line.

TABLE V.

Average number of clerks compared with Traffic, Class I Roads (incl. Switching & Terminal Roads) Calendar year, 1923

| Item | Eastern district | Pocahontas region | Southern dist. (excl. Pocahontas region) | Western district | United States |
|-------------------------------------|------------------|-------------------|--|------------------|---------------|
| No. of clerks (rep. div. 7-14)..... | 109,491 | 6,138 | 30,431 | 77,272 | 223,332 |
| No. of ton-miles (revenue, thous.) | 194,437,545 | 27,733,178 | 54,294,919 | 137,096,490 | 413,562,132 |
| No. of passenger-miles (thous.) | 19,257,342 | 777,089 | 4,672,840 | 13,298,651 | 38,005,922 |
| Ton-miles per clerk (thous.)* | 1,776 | 4,518 | 1,784 | 1,774 | 1,852 |
| Passenger-miles per clerk (thous.)* | 176 | 127 | 154 | 172 | 170 |

* Same division used for ton-miles and passenger-miles.

Individual Roads

A comparison of the relative number of clerks with total employees shows that individual roads are influenced by the conditions in the district in which they operate. From

Table VI., which includes the 25 largest roads reporting, the Erie heads the list in the per cent of clerks of total employees. This no doubt results from the fact that the Erie does relatively more maintenance work under contract, which tends to reduce the total number of names on the pay roll, thus increasing the ratio of clerks to total employees. On the whole, however, the agreements of the individual road percentages within each district are more striking than the differences.

TABLE VI.

Ratio of number of clerks to total number of employees for each of twenty-five steam roads with railway operating revenues above \$80,000,000

| District and system | Calendar year | | Last half of |
|---|---------------|------|--------------|
| | 1923 | 1922 | |
| Eastern District..... | 13.1 | 14.1 | 14.1 |
| Baltimore & Ohio..... | 11.7 | 13.4 | 14.1 |
| Boston & Maine..... | 12.3 | 12.7 | 13.1 |
| Delaware, Lackawanna & Western..... | 12.1 | 13.2 | 12.3 |
| Erie..... | 15.0 | 20.5 | 14.6 |
| New York Central..... | 13.6 | 14.6 | 14.7 |
| New York, New Haven & Hartford..... | 13.9 | 14.5 | 14.3 |
| Pennsylvania..... | 13.6 | 14.4 | 15.3 |
| Philadelphia & Reading..... | 11.2 | 11.8 | 11.8 |
| Poconos Region..... | 9.7 | 10.4 | 10.5 |
| Chesapeake & Ohio..... | 10.9 | 11.6 | 10.9 |
| Norfolk & Western..... | 8.2 | 8.8 | 9.7 |
| Southern District (Excluding Poconos Region)..... | 10.9 | 12.1 | 12.2 |
| Atlantic Coast Line..... | 9.3 | 10.3 | 10.5 |
| Illinois Central..... | 11.0 | 12.0 | 11.9 |
| Louisville & Nashville..... | 10.6 | 11.4 | 10.9 |
| Southern Railway..... | 10.9 | 12.8 | 13.4 |
| Western District..... | 11.0 | 11.7 | 11.4 |
| Atchison, Topeka & Santa Fe..... | 10.6 | 10.8 | 11.5 |
| Chicago & North Western..... | 10.0 | 10.3 | 10.3 |
| Chicago, Burlington & Quincy..... | 10.2 | 11.2 | 10.7 |
| Chicago, Milwaukee & St. Paul..... | 10.0 | 10.7 | 10.4 |
| Chicago, Rock Island & Pacific..... | 11.6 | 12.1 | 10.4 |
| Great Northern..... | 9.2 | 9.9 | 10.2 |
| Missouri Pacific..... | 12.2 | 12.4 | 11.8 |
| Northern Pacific..... | 11.5 | 11.8 | 11.6 |
| St. Louis-San Francisco..... | 11.8 | 12.1 | 12.6 |
| Southern Pacific..... | 10.9 | 11.8 | 11.5 |
| Union Pacific..... | 12.4 | 13.1 | 12.3 |
| United States..... | 11.9 | 12.8 | 12.7 |

Table VII shows for the same roads the percentage relation between compensation paid to clerks in 1923 with the revenues and expenses. The Erie now falls in line because the contract maintenance work does not reduce total revenues or expenses as it does the total number of employees. A high percentage in these tables does not of itself indicate inefficiency. One road may do its accounting more carefully than another and its corporate organization may be rendered more complicated by the association of many corporations in one operating system, or again, by more systematic records it may achieve more than compensating economies in operation.

TABLE VII.

Percentage comparison of compensation paid to clerks with revenues and expenses, 1923, for selected roads

| Name of system | Percentage, clerks' compensation of | | |
|-------------------------------------|-------------------------------------|------------------|---------------------------|
| | Total revenues % | Total expenses % | Transportation expenses % |
| Baltimore & Ohio..... | 5.2 | 6.6 | 14.0 |
| Boston & Maine..... | 6.2 | 7.1 | 13.1 |
| Delaware, Lackawanna & Western..... | 5.0 | 6.3 | 11.9 |
| Erie..... | 5.2 | 6.3 | 13.1 |
| New York Central..... | 5.2 | 6.9 | 15.0 |
| New York, New Haven & Hartford..... | 6.0 | 7.4 | 15.1 |
| Pennsylvania..... | 7.2 | 8.8 | 18.4 |
| Philadelphia & Reading..... | 4.5 | 6.1 | 12.1 |
| Chesapeake & Ohio..... | 4.5 | 5.9 | 13.7 |
| Norfolk & Western..... | 4.0 | 5.3 | 12.0 |
| Atlantic Coast Line..... | 4.6 | 6.3 | 13.0 |
| Illinois Central..... | 6.1 | 7.6 | 16.3 |
| Louisville & Nashville..... | 6.0 | 7.4 | 15.9 |
| Southern..... | 5.3 | 7.2 | 15.0 |
| Atchison, Topeka & Santa Fe..... | 5.1 | 7.0 | 16.5 |
| Chicago & North Western..... | 4.6 | 5.5 | 11.0 |
| Chicago, Burlington & Quincy..... | 4.5 | 5.8 | 12.2 |
| Chicago, Milwaukee & St. Paul..... | 4.9 | 6.2 | 12.5 |
| Chicago, Rock Island & Pacific..... | 5.2 | 6.5 | 12.6 |
| Great Northern..... | 3.7 | 5.2 | 10.0 |
| Missouri Pacific..... | 5.6 | 6.6 | 14.3 |
| Northern Pacific..... | 5.5 | 7.0 | 14.6 |
| St. Louis-San Francisco..... | 5.3 | 7.3 | 15.0 |
| Southern Pacific..... | 5.5 | 7.7 | 16.1 |
| Union Pacific..... | 5.2 | 7.2 | 16.6 |

As all of these roads are subject to the same statistical and accounting requirements by the federal government, the figures can not throw light on the effect of such requirements on clerical employment, but it is interesting to observe that

the additional statistical work done by western roads in connection with state regulation does not have sufficient effect to increase the percentage of clerks to total employees over that found in the East.

Continued Close Study Desirable

Considering the variety of causes affecting a growth in clerical expenses, we should be cautious about jumping to the conclusion that because clerical expense has increased, the requirements of government regulation are largely to blame. With about 12 out of every hundred employees engaged in clerical work, and with clerical expense aggregating 11.39 per cent of the pay roll and 7.01 per cent of operating expenses (1923) it is apparent that a continued close study of the organization and methods of this work and of the causes leading to the necessity for it, would be warranted.

D. & R. G. W. Reorganization Plan Approved

WASHINGTON, D. C.

THE INTERSTATE COMMERCE COMMISSION on June 11 made public a new order in the Denver & Rio Grande Western reorganization case, dated June 9, affirming with modifications its order of December 12, 1923, authorizing the proposed issuance of securities and assumption of obligation and liability in accordance with a revised plan submitted in an amended application, after a rehearing and reargument had been granted on the petition of the state of Colorado and its public utilities commission. The modification authorizes the issue of \$29,808,000 of general mortgage bonds as cumulative income bonds, for the period from February 1, 1924, to February 1, 1929, and the issue of the \$16,445,600 of preferred stock with changes in terms. The commission also authorized in a separate order the acquisition by the Missouri Pacific of one-half of the common stock, without par value, of the Denver & Rio Grande Western. The commission says in its report:

At the rehearing it was intimated that the reorganization managers, the applicant, the Missouri Pacific, the Western Pacific, and the security holders were in negotiation for the purpose of modifying the plan of reorganization, with a view to meeting, at least partially, the objections to the original determination by Division 4. These negotiations appear to have resulted in a modification of the plan of reorganization, making necessary an amendment of the application. Such amendment has been filed. It provides (1) that the \$29,808,000, principal amount, of general-mortgage bonds to be issued under and pursuant to, and to be secured by, a mortgage bearing date as of February 1, 1924, shall until February 1, 1929, be income bonds, cumulative from (February 1, 1924, to the full extent of 5 per cent per annum, instead of bonds carrying interest payable absolutely during that period, the provision being that the payment of the interest accruing on these bonds for the period from February 1, 1924, until February 1, 1929, shall not be mandatory even if the same shall have been earned by the applicant; but if earned and available, whether prior to February 1, 1929, or thereafter, the interest on the bonds accruing during the 5-year period (including accumulations, if any,) shall be paid to the extent that in the reasonable discretion of the board of directors of the applicant such payment is not inconsistent with due regard for the protection of the property of the applicant and the maintenance of efficient service thereon. Commencing February 1, 1929, the interest on these bonds accruing from and after that date will be a fixed charge upon the applicant; and (2) that an additional provision in respect of the payment of dividends upon the preferred stock shall be included in the applicant's by-laws reading: "It is recognized however that in view of the probable requirements of the property in the immediate future the directors of the new company may deem it prudent to apply a larger proportion of such earnings and profits to capital requirements during the period prior to February 1, 1929, than in subsequent years." The plan has also been modified with respect to the sinking fund for the general-mortgage bonds, in that the fund to be provided for this purpose may at the option of the board of directors of the applicant be applied either in the purchase of general-mortgage

bonds, or in capital expenditures, upon the property of the applicant subject to the lien of the general mortgage, and to the extent used for such capital expenditures shall not be made the basis for the payment of dividends upon the stock of the applicant. There is also another amendment providing that until February 1, 1929, all dividends declared upon the stock of the Utah Fuel Company shall in any event be paid directly to the applicant to be used by it for any lawful corporate purpose. A further amendment relates to the employment and payment of experts and accountants by the preferred stockholders' committee.

The Western Pacific and the Missouri Pacific have under date of March 3, 1924, entered into an agreement with the reorganization managers that they will upon the consummation of the plan of reorganization, as modified, purchase \$2,000,000, principal amount, of the new refunding and improvement bonds provided for by the plan and that they will at the same time purchase an additional \$1,000,000, principal amount, of such bonds if the reorganization managers deem it necessary for the purpose of the applicant, all of such bonds to be purchased at such prices as may be approved by us. Neither the application nor the amendment thereto requests authority from us for such issue of refunding and improvement bonds, and our action herein is not to be understood as granting such authority. As to the changes involved in the amendment of the plan and in the amendment to the application, the position of Colorado appears to be that the changes constitute a step in the right direction but do not go far enough.

At the rehearing and upon the reargument, our attention was directed to what are known as the underlying land, engineering, and accounting reports of our bureau of valuation.

The objections of the state of Colorado are directed principally, (1) to the relation between the proposed capitalization and the assets; (2) to the relation between the prospective earnings and fixed charges; (3) to the provisions made in regard to rehabilitation of the property and rendition of service; and (4) to certain features involved in the working out of the reorganization, such as the disposition of part of the funds made available for the consummation of the reorganization.

Excluding the \$4,500,000 of receiver's equipment-trust certificates, series A, in respect of which the applicant proposes to assume obligation and liability, the proposed capitalization amounts in the aggregate to \$127,365,600, consisting of underlying bonds to be assumed by the applicant, \$81,112,000; general-mortgage bonds proposed to be issued, \$29,808,000; and preferred stock, \$16,445,600. There is also to be included in the capitalization the 300,000 shares of the applicant's outstanding common stock without nominal or par value. The question we are now to consider is whether the assets are sufficient in amount for the purpose of authorizing the issue of securities as applied for. The evidence which we have before us as to the amount of assets embraces the accounts which show the book value of the property, the present capitalization of the property, the underlying land, engineering, and accounting reports hereinbefore mentioned, the testimony of witnesses, with exhibits, etc., etc. Our reports upon applications for authority to issue securities show, in many instances, that reference has often been made to existing capitalization and book entries as reflecting the amount of assets.

In the original report, 82 I. C. C. 745, 760, there is shown a tabular statement, based on the accounts of the applicant as of August 31, 1923, of the relation that should exist, after reorganization, between assets and liabilities, excluding capital liabilities, which statement shows a net excess of \$192,550,696.67 of assets to be acquired over liabilities to be assumed, excluding capital liabilities. In the proceedings under our order reopening this case, evidence has not been presented requiring changes to be made in the figures of that tabulation, except as it would be modified by the happenings since August 31, 1923, the principal of which is the issue of \$1,129,895 of receiver's certificates under the order of court of December 31, 1923. Further, the cash on hand as of December 31, 1923; is shown to have been \$3,166,586.77 with materials and supplies on hand as of that date in the amount of \$5,010,254.69. It appears that the total capitalization of the applicant after reorganization, including the \$4,500,000 of receiver's equipment-trust certificates, but excluding its common stock without nominal or par value, will be \$131,865,600, against which there will be net assets as shown above of \$192,550,696.67.

The public interests require that, before an issue of securities by a carrier is authorized, the probability of earnings sufficient to pay costs of operation and of fixed charges be reasonably established, with some surplus for dividends and other purposes. Has the probability of such earnings been so established in the present proceeding? We think it has. Going back as far as 1909, the annual reports covering the property involved indicate substantial regularity in the payment of interest upon the bonds secured upon the property until some time after the institution of the proceedings for the enforcement of the guaranty by the old Denver company of the bonds of the Western Pacific Railway Company.

The results of the past strongly support the conclusion that the

property may reasonably be expected to carry the burden of fixed charges according to the plan of reorganization; and that conclusion is strengthened by a consideration of the enhanced earning power that must result from the rehabilitation of the property. The difficulties of the last five or six years appear to be attributable to the guaranty of the Western Pacific Railway bonds and not to a lack of earning power.

We believe that the improvement in service that has taken place under the administration of the receiver may, in part, at least, be fairly attributed to the rehabilitation thus far accomplished; and that further improvements in service will result as additional rehabilitation work is completed. It is also believed that the rehabilitation work, done and yet to be done, will result in substantial savings in the cost of operation, and that the improvement in service will bring about additional business with the consequent result of additional earnings.

In our tentative plan for the consolidation of the railway properties of the United States into a limited number of systems, Consolidation of Railroads, 63 I. C. C. 455, the Denver & Rio Grande and the Western Pacific Railway are included in system No. 16, and the Missouri Pacific in system No. 19. Proceedings are now being had upon the tentative plan looking toward the adoption of a plan under which consolidations may take place in harmony therewith. The present proceeding is not an application under the provisions of subparagraph (c) of paragraph (6) of section 5 of the interstate commerce act for a consolidation of carriers in harmony with the plan. Herein we are acting only upon the application of the Denver & Rio Grande Western Railroad Company for authority to issue securities and assume obligations. The Western Pacific Railroad Corporation, which now owns the 300,000 shares of common stock of the applicant, is not a party to the application; neither is the Western Pacific Railroad Company a party thereto. Speaking in general terms, the lines of the Missouri Pacific extend eastwardly from Pueblo, Colo., and those of the Western Pacific Railroad Company westwardly from Salt Lake City, Utah, with the lines of the applicant lying between Pueblo and Salt Lake City. The common stock of the applicant, namely, the 300,000 shares without nominal or par value, possesses voting power. The preferred stock is not to have voting power. Under an agreement dated June 15, 1923, the Western Pacific will sell to the Missouri Pacific, and the Missouri Pacific will purchase, one-half of the 300,000 shares of the applicant's common stock, and the Missouri Pacific will pay therefor to the Western Pacific the sum of \$9,000,000.

On March 19, 1924, the Missouri Pacific filed an application under paragraph (2) of section 5 of the interstate commerce act for an order approving and authorizing the acquisition by it of 150,000 shares, or one-half, of the applicant's common stock. In Acquisition by Missouri Pacific of D. & R. G. W. Common Stock, post, by our order we concurrently approve and authorize such acquisition of stock. As the titular holders of certain refunding bonds and of certain adjustment bonds the Western Pacific and the Missouri Pacific will become entitled to certain portions of the preferred stock, for the issue of which our authority is requested in the present application, but as before pointed out that preferred stock will not have voting power. The problems that will arise upon applications for consolidations in harmony with the plan for consolidation of the railway properties of the United States into a limited number of systems, after such a plan shall have been adopted by us, will of course have to be solved when they arise. We see no reason for withholding our action in the matter now before us in anticipation of such problems.

Considering the entire record, that is, the original record that was before Division 4 and the record which has been made under the order reopening the proceedings, we find that the proposed issue of stock and bonds and the proposed assumption of obligation and liability in respect of certain securities in accordance with the application as amended (a) are for lawful objects within the applicant's corporate purposes, and compatible with the public interest, which are necessary and appropriate for and consistent with the proper performance by it of service to the public as a common carrier, and which will not impair its ability to perform that service, and (b) are reasonably necessary and appropriate for such purposes.

Commissioner Eastman in a dissenting opinion to which Commissioners Aitchison and McManamy subscribed said:

"This is the third reorganization plan for the Denver & Rio Grande which the commission has approved. The first plan, approved in Stock of Denver & Rio Grande Western R. R., 70 I. C. C. 102, was quite obviously unsound and broke down in short order. The second, approved in Denver & Rio Grande Western Reorganization, 82 I. C. C. 745, was modified to meet in part the objections of the state of Colorado when the case was reopened for rehearing, and as so modified constitutes the third plan which the majority now approve. I believed that neither the first nor the second plan was consistent with the public interest, and I am of the same opinion with reference to the third plan."

The Problem of Mechanical Statistics

The Limitations of the Classification of Operating Expenses for Purposes of Adequate Analysis

By J. E. Slater

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PART II—COST OF THE WORK PERFORMED

ANY STATISTICS of maintenance of equipment cost must necessarily have their fundamental basis in the classification of the maintenance of equipment expenses. While some railroads may obtain information much more voluminous than that actually required by the Interstate Commerce Commission, yet the expense figures must be so made that they can be totaled to the primary accounts prescribed. From a layman's standpoint, it is entirely logical that there should be separate accounts covering locomotives, freight train cars and passenger train cars. If, however, the statistics of cost do not go beyond these total figures, it is doubtful if any analyst can by the use of these figures determine with any degree of accuracy, the efficiency of the maintenance of equipment department. Each account covers a great variety of work and includes classes of work which are entirely dissimilar and which are controlled by entirely different circumstances. Each one of these accounts includes both the heavy work performed at the shops and the light work which is performed at engine houses or car inspection points.

Subdivision of Important

Maintenance Accounts Suggested

Let us illustrate this by the case of locomotives. Account "Steam Locomotive Repairs" includes the cost of both classified and running repairs. The cost of the classified repairs will vary from one-fifth to one-half of the total cost of the locomotive repairs, depending upon the conditions in the territory in which the railroad operates and also upon the policy of the company in putting the engines through the shops for classified repairs. On the other hand, the cost of running repairs is much more of a fixed item and is not in like degree subject to policy control. The number and cost of classified repairs also varies widely from month to month, while the cost of running repairs is more nearly fixed. Yet, we must take the total account for the month or year for locomotive repairs, with no subdivision of the expense as between the two entirely different classes of work. Even if we have the statistics of output there is no basis of judgment as to the total account since we have no way of determining what effect fluctuations in the number and cost of classified repairs should have on the entire expense.

While consideration is being given, therefore, to changes in the classification of accounts and when so much study is being devoted to the maintenance of equipment expense, it would seem that the time is ripe for a subdivision of the important maintenance of equipment accounts, such as locomotive repairs and freight and passenger train car repairs between the cost of the heavy and light repair work. Logically, this should be carried still further. The mechanical officers should know separately the cost of maintenance of different types of locomotives. On some railroads, such separation is made even to the extent of obtaining costs on individual engines. The cost of maintenance of different types of engines should be available in order that the favorable and unfavorable characteristics of different types of engines performing substantially the same class of work may be compared.

Just as important is it that mechanical officers should know separately the cost of maintaining different parts of a locomotive. It is the opinion of the writer that the railroads should be looking toward a method which would provide separately the cost of the maintenance of boilers and their accessories, the machinery, the running gear and the tenders. If the railroads should do this themselves, then the classification of the accounts should not be changed in any way which would prevent or complicate the work. It is not the intention to advocate that the Interstate Commerce Commission should prescribe a separation of this work, but in order to avoid duplicate records, whatever classification is set up should be so arranged that additional sub-divisions of the accounts can be made easily by the individual railroads.

Cars

Likewise, it is believed that the railroads should have better records than most of them now have showing the cost of repairing various types of freight cars, box, refrigerator, coal, flat, etc., with possible additional sub-divisions as between cost of repairs of cars with steel underframe, steel ends, wooden underframes, etc. In the case of passenger cars, the railroad should know the difference in the cost of the maintenance of steel and wooden cars and the difference in the cost of the maintenance of coaches, baggage cars, mail cars, dining cars, etc.

It is realized that this involves an enormous amount of detail and the writer doubtless will be placed among those calling for a cost accounting scheme of operating accounts. It is not the intention, however, to argue that the Interstate Commerce Commission should prescribe these separations, but it is believed that the railroads themselves should have the knowledge that such separation would provide and that when any changes are being made in the primary accounts, great care should be taken to avoid preventing or complicating any such attempt on the part of individual lines. No doubt there are many accounts of small consequence which can be eliminated or combined with others, but the changes which are now being advocated tend to hinder the railroads in any separations which they may themselves wish to make. While it may be agreed that we should not have a system of accounts set up on a cost accounting plan, we certainly should not set up a system of accounts which will prevent or hinder the railroads in deriving additional information as to efficiency and economy in the maintenance of its equipment. The two steps which it is believed are in the wrong direction are, first, the combination of steam and electric locomotive repairs into one account, and secondly, the setting up of the new account entitled "Shop Expense."

Steam and Electric Locomotives

While there are not many railroads which operate electric equipment, it is not likely that the number will decrease. On the railroads that do have the two classes of equipment, it is as absurd to combine steam and electric locomotive repairs as it is to combine the cost of freight train and passenger train car repairs.

The setting up of the account "Shop Expense" will pro-

vide a "no-man's land" of expenses which can, with difficulty, be assigned directly to an individual class of equipment. It must of necessity include charges of all kinds which cannot be assigned directly to locomotive repairs, car repairs, etc., and in spite of specific instructions as to what should be included, it will probably include a different proportion of the charges on each railroad, depending upon the care which is taken to assign the expenses to the individual classes of work or equipment. Supervisory or general charges of all kinds are always troublesome because they are not in themselves primary causes of expense. The setting up of the account "Shop Expense" will add one more difficulty in allocating the expenses to the fundamental cause which brings that expense about. When it is not possible to determine the fundamental cause of an expense, it is naturally more difficult to determine whether that expense is justified or not.

Summarizing the difficulties with respect to statistics of cost, we find substantially the same trouble as in the statistics of output. Unlike elements are included in the same account, just as unlike elements are included in the number of classified repairs, number of engines, dispatched, etc. As long as the accounts combine unlike elements, just so long will it be difficult to arrive at an accurate basis of judgment as to reasonableness of the expenses.

A Cost Time-Keeping System

As previously explained, the principal trouble with all maintenance of equipment statistics is that each repair job is different and, therefore, the output of the shop or engine house can not be measured by the number of jobs even though these may be segregated in a few general classes. We have suggested the possibility of enlarging these classes so that the differences between the jobs that are included in the same class will be less than now is the case. Even under these conditions, however, the same objection would apply though in a lesser degree. There is one method which has been used and is being worked out on a few roads which provides an absolute check as to the character and efficiency of the work done. This is a complete cost time keeping system. Under this arrangement a record is kept of each bit of individual work performed by each employee and the time of performing that work.

In some cases, this is compared with a standard time for doing the same work and bonuses paid where the actual work done is within a certain percentage of or better than the standard. The payment of bonus, however, is not inherent to the cost time keeping idea, the chief object of which is to provide a complete record of every piece of work done, with the length of time required. This, of course, was worked out on the Santa Fe many years ago. It has been tried out on other roads and has been used on the New Haven for some time. On account of the vast number of individual pieces of work done and because of the enormous amount of detailed clerical work necessary to make this data available, the system on the New Haven has been worked in conjunction with the operation of tabulating machines, which, in the end will provide a flexible method of making the information quickly and readily available for the use of supervisory officers. Under such a method of accounting, it is possible to compare with reasonable accuracy the efficiency with which work is performed on different locomotives at the same or different shops, because full information is available as to exactly what was done on each locomotive with the time required to perform that work.

Value Still to Be Proved

In spite of the advantage which this gives, it must be conceded that the value of cost time-keeping is still to be proved. Even with the use of labor saving machines, it necessarily involves the expenditure of large sums of money, both for the collection of the information and for supervision. There

is one further objection—that the cost time-keeping method provides such an enormous mass of information that it is difficult to give current and constant attention to all of the information which is provided. To everyone experienced in transportation statistics there will occur instances of large and elaborate reports which have given less valuable results than other simple reports which provided the information which is really controlling as to performance and expense. It requires a large statistical and analytical force to give proper attention to all of the information which is made available by a cost time-keeping system. It also takes a large force to keep this information so closely up-to-date that the proper corrective action can be taken promptly after the performance takes place. Experience has long since shown that statistics of any kind must be made available promptly if they are to be of real value. Wherever cost time-keeping is employed as a method of supervising performance, the greatest care must be taken to see that these figures are compiled quickly and are available for use by the supervisory officer in a form which can be quickly and readily understood.

As to the last criticism, some distinction must be made as to cost time-keeping where bonus is and is not paid. Cost time-keeping or its equivalent is necessary for most bonus plans and the data may, therefore, be compiled primarily on that account. The bonus plan has other important advantages even greater than the additional data furnished. Even in this case, however, the information should be used for general supervisory purposes as well as for the computing of bonus, because the cost time-keeping statistics unquestionably provide a mine of information where it is properly used.

More Intelligent Measuring Stick Needed

If the cost time-keeping is not practicable or is too expensive, certainly something should be worked out in its place. While the criticisms which have been made do not apply to all railroads, it has been the writer's observation that they apply to many of them, including many of the larger systems. The statistics showing condition of engines should be standardized. The statistics of output should be increased so as to provide a more intelligent measuring stick of the amount of work performed. The operating accounts should be subdivided so that information will be available as to the cost of maintenance of the different classes and types of equipment, locomotives, freight cars and passenger cars. Furthermore, we should look toward a sub-division of the important expenses of repairing locomotives and cars.

The criticisms which have been made apply to the general statistical information available to the railroads, whether required or not. The writer does not advocate that the Interstate Commerce Commission require these numerous sub-divisions. General information as to condition of equipment is now available in the Car Service Division's reports and when this information is more nearly standardized and the objections which can now justly be made are eliminated, the data will be sufficiently reliable.

With reference to the output: The railroads themselves, with the Car Service Division, can well afford to give considerable thought to the further sub-division of the classes of repairs, both locomotive, passenger and freight train car. If the railroads could do this themselves and provide the information to the Car Service Division, it would not be necessary for the Interstate Commerce Commission to require anything more than at present. As to statistics of cost, the Interstate Commerce Commission can co-operate in its requirements as to operating expenses. It is most sincerely to be hoped that if any changes are made at the present time no steps will be taken which will hinder or prevent the railroads themselves from delving further into the question of expenses and making the additional sub-divisions which, it is believed, must be made before we have sufficient knowledge of our maintenance expenses.

General News Department

The American Short Line Railroad Association will hold its annual meeting at San Francisco, Cal., on August 13, 14 and 15.

Five gold watches were given last week by the Erie Railroad to five men who have each "commuted" in its New York district for more than fifty years. The oldest of the five, J. Z. Demarest, of Closter, N. J., does not go to New York at all—that is, not on his season ticket. He travels to and from his newspaper office at Tenafly, about four miles. He bought his first commutation ticket in 1867. The other four had traveled nearly as long. They are J. H. Stout, C. I. E. Masten, A. Van Buskirk and M. B. Smith.

Steel Rail Production

The production of steel rails in the United States for the calendar year 1923 totaled 2,904,516 tons, which is larger than in any other year since 1917, when the total was 2,944,161 tons, according to statistics issued by the American Iron & Steel Institute. The production in 1923 exceeds that for 1922 by 732,740 tons. However, it is considerably under the production in years past. The total in 1906 was 3,977,887 tons.

Compendium of Automobile Stop-Laws

Laws and rules regulating the management of automobiles in approaching railroad crossings is the subject of a pocket-size pamphlet of 48 pages which has been prepared by the Association of Railway Claim Agents; extracts from the statutes and the orders of public commissions in each of the states of the Union where action of this kind has been taken. The pamphlet is issued by the secretary of the Association, H. D. Morris, Northern Pacific Railway, St. Paul, Minn.

A. R. A. to Investigate Locomotive Service

The board of directors of the American Railway Association announces the appointment of a joint committee of the operating and mechanical divisions to make a study of the utilization of locomotives to determine A the percentage of time that should be available to perform actual transportation and B the methods for obtaining maximum efficiency while so available.

The joint committee will consist of the following representatives of the operating division, A. E. Ruffer, transportation manager, Erie; T. B. Hamilton, general manager, northwestern region, Pennsylvania; J. T. Gillock, general manager, Chicago, Milwaukee & St. Paul. Representing the mechanical division are F. H. Hardin, chief engineer, motive power and rolling stock, New York Central; O. S. Jackson, superintendent motive power and machinery, Union Pacific; W. H. Fetner, chief mechanical officer, Missouri Pacific.

Safety on the C. & N. W.

The Chicago & North Western has preached and practiced safety 13½ years. Members of the safety committees have made 73,405 recommendations for the elimination of dangerous conditions and practices and all but 3,132 have been adopted and put into effect. During this period 617 fewer employees were killed than in the previous 13½ years (ending June 30, 1910), a decrease of 42.49 per cent; 32,464 fewer employees were injured, a decrease of 27.81 per cent; 23 fewer passengers were killed, a decrease of 15.7 per cent; 3,065 fewer passengers were injured, a decrease of 24.4 per cent; 917 fewer outsiders were killed, a decrease of 28.72 per cent and 663 fewer outsiders were injured, a decrease of 8.05 per cent. During 1910 the total of ton miles of freight moved by this road was 5,515,535,840, compared with 9,248,615,383 in 1923; while 97 em-

ployees were killed and 8,404 were injured in 1910 as compared with 38 killed and 6,135 injured in 1923. The tons carried one mile for each employee killed increased from 56,861,195 in 1910 to 243,384,615 in 1923; an increase of 328 per cent in the chances of safety to the individual. Safety banners for the best work in accident prevention during 1923 were awarded to the Eastern division, the Missouri Valley shops and the Milwaukee Terminal safety committees.

Unfavorable Report on Hudson Bay Railway

A hitherto unpublished report on the feasibility of completing the Hudson Bay Railway in which the author of that report, David W. MacLachlan, engineer in charge of dredging operations at Port Nelson, stated that that route had little chance of being able to compete with the present lake and rail route for export grain, was tabled in the House of Commons at Ottawa last week. Mr. MacLachlan began his report which was submitted to the Department of Railways and Canals in September, 1917, with the following words: "Many times in the past four years I have been on the verge of coming out in absolute condemnation of the undertaking on which I am engaged, but so long as I thought there was a chance of the Hudson Bay Railway proving of value for any national purpose I thought I had better not do so, especially as I knew you were always one of its strong supporters." The gentleman referred to in the last sentence is the late W. A. Bowden, chief engineer of the Department of Railways and Canals at the time the report was submitted and who died last year.

"In the light of ice conditions this year I have come to the conclusion," continues Mr. MacLachlan, "that the season for tramp steamships on this route is going to be so short that the cost of doing every item of work in the handling and transporting of merchandise is going to be so great that the route is not going to be able to compete with the lake route to Georgian Bay and rail to Montreal." Mr. MacLachlan estimates the average season of navigation into Port Nelson at two months; that is, between the actual docking of the first ship and the departure of the last. He submitted an estimate he had made based on the rates at that day showing that the rate on grain from Saskatoon to Liverpool via Fort William and Montreal was 26.4 cents per bushel. It would have cost 19.9 cents per bushel to haul the grain from Saskatoon to Port Nelson, including handling charges, leaving a margin of 65 cents for the ocean rate, extra insurance and interest on the cost of works. The average rate obtained by tramp steamers carrying grain from Montreal to Liverpool was 7 cents. Mr. MacLachlan states that tramp steamers would inevitably choose the Montreal route unless there was a considerably higher margin to induce them to go to Port Nelson.

This report is likely to cause a storm in the House of Commons from the Progressive members from Western Canada who have for some years been strongly urging the completion of the Hudson Bay Railway as, to use their words, "the logical outlet of their grain products to the markets of Europe." Almost every Canadian government in the past 20 years has promised to build this road and develop the Bay water route, the reason usually being that it would win the support of Western Canada, but no government has been willing to carry out the project when elected.

Late last week W. D. Euler, Liberal member for North Waterloo, asked the Minister of Railways and Canals whether or not any reports on the Hudson Bay Railway project had been made and received by him subsequent to that of David W. MacLachlan in 1917. The Minister stated that the reason only one had been submitted to the House was that only the report of 1917 had been asked for. He said there were other reports which in fairness ought to be tabled, and he said he would have these copied and submitted to the House as soon as they were asked for. Loud applause from the Progressives, who are pressing for the completion of the Hudson Bay Railway, greeted this announcement of Mr. Graham.

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF APRIL AND FOUR MONTHS OF CALENDAR YEAR 1924

| Name of road. | Average mileage operated during period. | Operating revenues | | | Operating expenses | | | Operating ratio. | Net from railway operation. | Net operating income. | Net op. income 1923. |
|---|---|--------------------|------------|--------------------|------------------------------------|-----------|------------|------------------|-----------------------------|-----------------------|----------------------|
| | | Freight. | Passenger. | Total (inc. misc.) | Maintenance of way and structures. | Traffic. | Portation. | | | | |
| Akron, Canton & Youngstown.....Apr. | 170 | \$221,912 | \$660 | \$230,037 | \$40,443 | \$10,014 | \$63,805 | 64.20 | \$82,319 | \$40,576 | \$53,524 |
| Alabama & Vicksburg.....Apr. | 170 | 893,916 | 2,855 | 931,101 | 120,123 | 36,395 | 265,598 | 59.00 | 381,788 | 327,093 | 183,499 |
| Alabama & Vicksburg.....Apr. | 141 | 224,958 | 56,570 | 301,914 | 64,723 | 10,159 | 95,532 | 72.40 | 83,316 | 56,244 | 183,499 |
| Alabama & Vicksburg.....Apr. | 141 | 841,852 | 241,725 | 1,162,167 | 200,416 | 38,237 | 403,394 | 79.90 | 233,529 | 157,537 | 173,094 |
| Vicksburg, Shreveport & Pacific.....Apr. | 188 | 242,431 | 85,242 | 347,668 | 56,301 | 13,261 | 119,075 | 77.20 | 80,909 | 46,247 | 72,260 |
| Ann Arbor.....Apr. | 188 | 940,668 | 355,427 | 1,296,095 | 247,543 | 48,897 | 498,318 | 72.70 | 242,182 | 88,568 | 254,283 |
| Ann Arbor.....Apr. | 293 | 418,941 | 38,882 | 476,903 | 42,660 | 9,648 | 102,681 | 77.70 | 106,095 | 84,636 | 62,703 |
| Ann Arbor.....Apr. | 293 | 1,603,274 | 188,457 | 1,830,118 | 159,772 | 36,470 | 824,601 | 80.20 | 362,451 | 136,640 | 192,555 |
| Atchison, Topeka & Santa Fe.....Apr. | 8,997 | 9,657,955 | 3,343,328 | 14,800,548 | 2,668,974 | 318,885 | 4,971,892 | 82.90 | 2,457,393 | 1,526,630 | 3,124,855 |
| Gulf, Colorado & Santa Fe.....Apr. | 8,999 | 37,878,661 | 14,604,070 | 57,950,287 | 8,037,282 | 1,237,006 | 20,042,182 | 79.30 | 11,969,244 | 7,834,023 | 14,099,891 |
| Gulf, Colorado & Santa Fe.....Apr. | 1,908 | 3,485,732 | 302,646 | 4,028,331 | 593,762 | 44,973 | 701,820 | 101.10 | -21,904 | -106,454 | 53,993 |
| Gulf, Colorado & Santa Fe.....Apr. | 1,908 | 6,247,848 | 1,259,545 | 8,027,318 | 1,977,965 | 184,077 | 2,775,849 | 92.40 | 608,294 | 267,608 | 372,236 |
| Panhandle & Santa Fe.....Apr. | 858 | 551,468 | 109,223 | 714,369 | 182,533 | 7,735 | 236,145 | 92.40 | 54,613 | 31,115 | 18,609 |
| Panhandle & Santa Fe.....Apr. | 858 | 2,335,247 | 473,151 | 2,966,681 | 514,458 | 30,669 | 909,290 | 79.30 | 617,336 | 377,691 | 151,703 |
| Atlanta & West Point.....Apr. | 93 | 141,690 | 67,235 | 242,809 | 46,076 | 9,471 | 94,004 | 80.80 | 46,410 | 16,140 | 34,465 |
| Atlanta & West Point.....Apr. | 93 | 566,616 | 293,133 | 967,265 | 129,447 | 3,076 | 357,424 | 76.50 | 231,819 | 126,225 | 133,163 |
| Western of Alabama.....Apr. | 133 | 175,932 | 62,786 | 266,185 | 32,161 | 9,793 | 75,337 | 70.60 | 78,241 | 63,925 | 52,921 |
| Atlanta, Birmingham & Atlantic.....Apr. | 133 | 676,409 | 277,423 | 1,060,294 | 136,931 | 38,233 | 320,649 | 44.26 | 760,128 | 244,049 | 200,525 |
| Atlanta, Birmingham & Atlantic.....Apr. | 639 | 316,922 | 18,940 | 393,177 | 75,568 | 23,334 | 168,093 | 93.41 | 25,917 | 12,753 | 36,339 |
| Atlanta, Birmingham & Atlantic.....Apr. | 639 | 1,306,210 | 153,466 | 1,598,649 | 286,302 | 8,636 | 688,197 | 91.83 | 130,612 | 25,573 | 97,247 |
| Atlantic Coast Line.....Apr. | 4,864 | 5,303,450 | 1,537,455 | 7,534,473 | 853,590 | 119,972 | 2,587,787 | 68.30 | 2,390,149 | 1,939,067 | 2,828,123 |
| Charleston & Western Carolina.....Apr. | 4,864 | 21,265,219 | 7,646,747 | 31,304,357 | 3,300,742 | 509,165 | 10,521,944 | 66.10 | 10,649,758 | 8,944,022 | 7,932,194 |
| Baltimore & Ohio.....Apr. | 5,303 | 14,812,760 | 2,427,171 | 18,574,172 | 2,350,774 | 119,972 | 5,587,787 | 78.80 | 3,940,622 | 3,074,983 | 4,011,487 |
| Baltimore & Ohio.....Apr. | 5,303 | 61,181,935 | 9,250,967 | 75,997,876 | 9,852,066 | 1,438,965 | 29,991,724 | 81.80 | 13,662,726 | 10,189,432 | 14,524,143 |
| Baltimore & Ohio.....Apr. | 80 | ..... | ..... | 1,171,505 | 185,237 | 7,735 | 738,403 | 104.60 | -13,805 | -53,690 | 46,152 |
| Baltimore & Ohio.....Apr. | 80 | ..... | ..... | 1,171,505 | 185,237 | 7,735 | 738,403 | 101.40 | -16,902 | -169,852 | 170,234 |
| Staten Island Rapid Transit.....Apr. | 23 | 97,156 | 96,861 | 217,472 | 32,141 | 1,916 | 121,373 | 94.80 | 11,345 | -3,806 | 15,195 |
| Bangor & Aroostook.....Apr. | 23 | 378,320 | 379,386 | 757,706 | 108,981 | 8,269 | 480,707 | 95.70 | 35,514 | -28,927 | -153,810 |
| Bangor & Aroostook.....Apr. | 616 | 335,444 | 86,790 | 422,234 | 135,570 | 3,864 | 164,916 | 65.60 | 214,808 | 165,054 | 295,926 |
| Belt Ry. Co. of Chicago.....Apr. | 32 | ..... | ..... | 586,272 | 56,348 | 2,692 | 250,397 | 67.10 | 182,816 | 761,746 | 567,846 |
| Belt Ry. Co. of Chicago.....Apr. | 32 | ..... | ..... | 2,800,921 | 165,595 | 3,810 | 1,138,965 | 71.20 | 658,040 | 499,760 | 548,327 |
| Bessemer & Lake Erie.....Apr. | 238 | 660,377 | 26,334 | 1,007,619 | 135,804 | 14,534 | 335,956 | 99.30 | 7,506 | -34,998 | 267,226 |
| Bessemer & Lake Erie.....Apr. | 228 | 3,207,093 | 103,968 | 3,394,693 | 400,612 | 59,080 | 1,235,173 | 107.60 | -257,172 | -427,298 | 1,558,036 |
| Bingham & Garfield.....Apr. | 34 | 35,752 | ..... | 37,423 | 6,718 | 1,781 | 9,488 | 80.50 | 7,284 | -2,909 | 17,813 |
| Boston and Maine.....Apr. | 2,287 | 143,223 | 1,685,853 | 1,829,076 | 23,863 | 6,484 | 41,923 | 79.60 | 30,444 | 10,721 | 65,806 |
| Boston and Maine.....Apr. | 2,287 | 3,933,050 | 7,041,020 | 10,974,070 | 805,056 | 41,033 | 2,878,046 | 83.90 | 1,035,279 | 774,049 | 483,938 |
| Brooklyn Eastern District Terminal.....Apr. | 9 | 108,358 | ..... | 116,871 | 10,777 | 1,065 | 44,187 | 84.80 | 3,332,699 | 2,090,284 | 2,478,423 |
| Buffalo & Susquehanna R. R. Corp.....Apr. | 253 | 133,041 | 6,393 | 139,434 | 13,943 | 2,009 | 46,677 | 59.40 | 196,701 | 167,522 | 249,802 |
| Buffalo & Susquehanna R. R. Corp.....Apr. | 253 | 701,480 | 24,408 | 740,169 | 136,368 | 7,999 | 240,014 | 100.80 | -5,635 | 106,784 | 312,346 |
| Buffalo, Rochester & Pittsburgh.....Apr. | 591 | 964,460 | 149,541 | 1,172,614 | 143,673 | 25,019 | 482,841 | 86.80 | 155,273 | 125,239 | 196,058 |
| Canadian Pacific Lines in Maine.....Apr. | 233 | 4,833,261 | 577,070 | 5,632,228 | 653,667 | 97,388 | 2,335,273 | 93.20 | 380,483 | 244,858 | 1,142,638 |
| Carolina, Clinchfield & Ohio.....Apr. | 309 | 2,613,928 | 186,777 | 2,800,705 | 311,833 | 104,733 | 800,869 | 81.10 | 49,553 | 38,553 | 55,963 |
| Central of Georgia.....Apr. | 1,920 | 1,597,098 | 427,937 | 2,248,736 | 346,437 | 62,995 | 893,708 | 77.90 | 405,004 | 396,614 | 372,158 |
| Central of New Jersey.....Apr. | 691 | 3,360,233 | 702,287 | 4,336,629 | 1,072,778 | 32,569 | 1,816,250 | 76.60 | 2,118,317 | 1,671,428 | 1,598,743 |
| Central Vermont.....Apr. | 434 | 13,802,326 | 2,724,026 | 17,500,077 | 1,855,440 | 140,704 | 7,414,784 | 85.00 | 2,626,813 | 1,166,185 | 883,760 |
| Chesapeake & Ohio.....Apr. | 2,558 | 6,993,348 | 911,461 | 8,393,229 | 1,128,188 | 90,280 | 2,606,077 | 91.40 | 240,556 | 164,736 | 36,016 |
| Chicago & Alton.....Apr. | 1,050 | 1,632,493 | 498,614 | 2,334,802 | 369,751 | 60,405 | 882,706 | 85.40 | 7,943,184 | 6,430,170 | 5,640,488 |
| Chicago & Alton.....Apr. | 1,050 | 6,876,100 | 2,049,636 | 9,889,089 | 1,015,246 | 234,291 | 3,853,386 | 79.40 | 2,041,455 | 1,675,862 | 1,501,334 |

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF APRIL AND FOUR MONTHS OF CALENDAR YEAR 1924—CONTINUED

| Name of road | Average mileage operated during period | Operating revenues | | | Operating expenses | | | Operating ratio, % | Net from railway operation, 1924 | Operating income (or loss), 1924 | Net operating income, 1924 | Net income 1922 |
|---|--|--------------------|-----------|--------------------|--------------------|-----------|------------------|--------------------|----------------------------------|----------------------------------|----------------------------|-----------------|
| | | Freight | Passenger | Total (inc. misc.) | Way and structures | Traffic | Trans- portation | | | | | |
| Chicago & Eastern Illinois..... | 945 | \$1,409,497 | \$382,200 | \$1,791,697 | \$199,404 | \$51,858 | \$844,957 | 93.80 | \$1,200,291 | \$19,439 | \$65,557 | \$307,219 |
| Chicago & North Western..... | 945 | 6,882,357 | 1,593,546 | 8,475,903 | 950,204 | 2,793,123 | 3,858,830 | 88.80 | 7,022,779 | 609,274 | 426,607 | 1,385,039 |
| Chicago & North Western..... | 846 | 7,709,683 | 2,287,854 | 10,000,000 | 1,799,682 | 5,883,918 | 4,887,178 | 90.40 | 10,234,102 | 334,130 | 240,505 | 698,048 |
| Chicago, Burlington & Quincy..... | 940 | 8,811,957 | 1,929,335 | 10,741,292 | 1,634,537 | 2,759,607 | 4,447,007 | 83.80 | 7,650,836 | 4,613,119 | 3,753,668 | 2,688,381 |
| Chicago Great Western..... | 1,496 | 5,754,778 | 1,342,667 | 7,097,445 | 876,431 | 1,654,797 | 2,203,859 | 77.30 | 2,788,900 | 1,900,293 | 1,675,048 | 2,425,005 |
| Chicago, Indianapolis & Louisville..... | 654 | 1,038,664 | 258,465 | 1,297,129 | 166,643 | 335,396 | 508,558 | 76.10 | 1,343,026 | 266,318 | 135,637 | 163,184 |
| Chicago, Milwaukee & St. Paul..... | 10,986 | 8,641,699 | 1,761,244 | 10,402,943 | 2,643,430 | 3,143,938 | 4,335,962 | 75.30 | 1,408,868 | 1,128,559 | 631,606 | 670,178 |
| Chicago, Peoria & St. Louis..... | 247 | 71,558 | 11,670 | 83,228 | 18,962 | 14,979 | 52,648 | 96.07 | 7,401,464 | 4,221,125 | 2,775,629 | 5,038,759 |
| Chicago River & Indiana..... | 19 | ..... | ..... | ..... | ..... | ..... | ..... | 103.80 | ..... | ..... | ..... | ..... |
| Chicago, Rock Island & Pacific..... | 7,635 | 6,658,409 | 1,988,300 | 8,646,709 | 1,255,664 | 2,465,006 | 3,870,310 | 86.50 | 1,262,856 | 741,973 | 398,071 | 947,967 |
| Chicago, Rock Island & Gulf..... | 461 | 347,123 | 71,888 | 419,011 | 66,907 | 76,936 | 16,656,397 | 81.50 | 7,108,467 | 5,029,434 | 3,507,407 | 1,993,112 |
| Chicago, St. Paul, Minn. & Omaha..... | 1,749 | 4,450,308 | 487,773 | 4,938,081 | 265,789 | 451,796 | 958,734 | 74.40 | 1,182,296 | 17,006 | 384,462 | 40,733 |
| Cincinnati, Indianapolis & Western..... | 347 | 281,442 | 29,247 | 310,689 | 59,750 | 71,184 | 143,970 | 83.10 | 503,642 | 453,347 | 336,961 | 36,472 |
| Colorado & Southern..... | 1,099 | 762,646 | 135,215 | 897,861 | 111,571 | 264,312 | 394,846 | 85.80 | 175,072 | 194,120 | 1,004,875 | 923,613 |
| Pa. Worth & Denver City..... | 456 | 552,800 | 131,345 | 684,145 | 72,633 | 73,687 | 1,007,779 | 85.00 | 1,249,110 | 10,216 | 1,359 | 1,017 |
| Wichita Valley..... | 271 | 97,928 | 21,460 | 119,388 | 23,935 | 8,646 | 187,385 | 82.40 | 205,730 | 13,273 | 64,907 | 67,283 |
| Columbus & Greenville..... | 167 | 93,129 | 24,037 | 117,166 | 33,907 | 16,349 | 46,031 | 82.80 | 175,072 | 1,004,875 | 1,359 | 1,017 |
| Delaware & Hudson..... | 894 | 3,092,096 | 271,610 | 3,363,706 | 479,204 | 986,852 | 1,370,369 | 84.90 | 540,715 | 437,919 | 436,237 | 696,349 |
| Delaware, Lackawanna & Western..... | 992 | 5,332,061 | 1,051,474 | 6,383,535 | 1,916,596 | 4,335,358 | 6,072,687 | 86.60 | 1,663,984 | 1,273,917 | 1,380,738 | 187,718 |
| Denver & Rio Grande Western..... | 2,598 | 1,778,541 | 349,258 | 2,127,799 | 344,707 | 573,038 | 780,273 | 78.60 | 1,663,349 | 1,132,784 | 1,176,019 | 704,413 |
| Denver & Salt Lake..... | 255 | 1,650,915 | 23,500 | 1,674,415 | 1,085,174 | 2,689,507 | 3,444,768 | 82.40 | 6,207,283 | 4,143,526 | 4,394,657 | 1,952,288 |
| Detroit & Mackinac..... | 375 | 108,743 | 26,403 | 135,146 | 27,633 | 38,272 | 58,498 | 88.70 | 15,675 | 16,675 | 4,494 | 13,296 |
| Detroit & Toledo Shore Line..... | 61 | 242,556 | ..... | 242,556 | 50,838 | 30,965 | 84,912 | 88.40 | 66,342 | 25,306 | 68,995 | 12,167 |
| Detroit Terminal..... | 18 | ..... | ..... | ..... | ..... | ..... | ..... | 71.80 | 550,235 | 453,881 | 102,031 | 327,105 |
| Detroit, Toledo & Iron Range..... | 468 | 1,133,703 | 7,663 | 1,141,366 | 132,772 | 162,788 | 2,377,166 | 55.60 | 1,897,269 | 1,779,339 | 1,252,450 | 472,718 |
| Duluth & Iron Range..... | 280 | 242,138 | 11,913 | 254,051 | 75,868 | 140,652 | 131,838 | 130.80 | 86,447 | 127,565 | 121,916 | 207,366 |
| Duluth, Missale & Northern..... | 305 | 663,306 | 66,527 | 729,833 | 255,760 | 552,743 | 561,879 | 178.80 | 645,711 | 719,271 | 732,714 | 754,308 |
| Duluth, South Shore & Atlantic..... | 591 | 361,402 | 92,814 | 454,216 | 87,709 | 137,999 | 1,188,779 | 129.80 | 148,218 | 237,337 | 242,989 | 403,361 |
| Duluth, Winnipeg & Pacific..... | 178 | 151,139 | 19,680 | 170,819 | 27,545 | 30,466 | 628,850 | 243.40 | 1,294,248 | 1,719,518 | 1,728,972 | 1,669,917 |
| Elgin, Joliet & Eastern..... | 459 | 1,819,488 | 74 | 1,819,562 | 56,469 | 87,709 | 215,277 | 79.20 | 101,234 | 71,234 | 46,634 | 25,446 |
| El Paso & Southwestern..... | 1,139 | 7,866,711 | 178 | 8,044,889 | 1,872,693 | 2,190,405 | 3,888,771 | 82.10 | 335,744 | 219,663 | 109,683 | 13,509 |
| El Paso & Southwestern..... | 459 | 864,210 | 156,659 | 1,020,869 | 177,675 | 27,545 | 33,575 | 81.20 | 33,563 | 21,701 | 23,563 | 3,503 |
| El Paso & Southwestern..... | 1,139 | 3,235,721 | 760,311 | 4,205,780 | 888,500 | 98,264 | 343,575 | 71.20 | 255,465 | 211,700 | 215,399 | 115,463 |
| Elgin, Joliet & Eastern..... | 459 | 1,819,488 | 74 | 1,819,562 | 56,469 | 87,709 | 215,277 | 79.20 | 101,234 | 71,234 | 46,634 | 25,446 |
| El Paso & Southwestern..... | 1,139 | 7,866,711 | 178 | 8,044,889 | 1,872,693 | 2,190,405 | 3,888,771 | 82.10 | 335,744 | 219,663 | 109,683 | 13,509 |
| El Paso & Southwestern..... | 459 | 864,210 | 156,659 | 1,020,869 | 177,675 | 27,545 | 33,575 | 81.20 | 33,563 | 21,701 | 23,563 | 3,503 |
| El Paso & Southwestern..... | 1,139 | 3,235,721 | 760,311 | 4,205,780 | 888,500 | 98,264 | 343,575 | 71.20 | 255,465 | 211,700 | 215,399 | 115,463 |

* Now a class one carrier.

MONTH OF APRIL AND FOUR MONTHS OF CALENDAR YEAR 1924—CONTINUED

| Name of road. | Average mileage operated during period. | Operating revenues. | | | Operating expenses. | | | Total. | Operating ratio. | Net from railway operation. | Operating income (or loss). | Net operating income. | Net income 1923. |
|---------------------------------------|---|---------------------|-------------|-------------|---------------------|-----------------|-----------|-------------|------------------|-----------------------------|-----------------------------|-----------------------|------------------|
| | | Freight. | Passenger. | Total. | Traffic. | Transportation. | General. | | | | | | |
| Chicago & Erie..... | Apr. 2,055 | \$6,768,162 | \$1,050,285 | \$8,515,216 | \$1,215,770 | \$2,065,120 | \$123,361 | \$3,297,709 | \$268,343 | \$7,016,924 | \$2,154,850 | \$1,472,041 | \$1,821,839 |
| Chicago & Erie..... | Apr. 2,055 | 27,740,337 | 4,108,840 | 34,652,834 | 4,052,838 | 9,625,350 | 575,144 | 13,976,190 | 1,120,482 | 29,518,672 | 4,509,883 | 4,756,047 | 4,509,883 |
| Chicago & Erie..... | Apr. 269 | 980,589 | 54,302 | 1,108,217 | 131,309 | 144,326 | 21,328 | 401,029 | 36,027 | 733,551 | 323,213 | 470,268 | 41,987 |
| Chicago & Erie..... | Apr. 269 | 4,206,536 | 219,553 | 4,785,373 | 426,531 | 659,000 | 90,255 | 1,753,089 | 148,616 | 3,077,429 | 1,497,079 | 279,137 | -404,048 |
| New Jersey & New York..... | Apr. 45 | 21,431 | 100,237 | 121,354 | 23,009 | 20,007 | 990 | 62,679 | 3,213 | 109,892 | 16,462 | -17,594 | -1,819 |
| New Jersey & New York..... | Apr. 45 | 95,222 | 389,453 | 504,822 | 69,009 | 82,085 | 4,410 | 268,597 | 13,989 | 439,967 | 64,861 | 50,009 | -64,737 |
| N. Y., Susquehanna & Western..... | Apr. 135 | 268,489 | 57,941 | 371,558 | 33,860 | 97,312 | 3,118 | 190,170 | 10,774 | 355,212 | 19,346 | -10,195 | 21,155 |
| N. Y., Susquehanna & Western..... | Apr. 135 | 1,092,046 | 230,671 | 1,508,149 | 202,110 | 388,757 | 14,127 | 881,761 | 43,730 | 1,500,407 | 7,742 | -115,166 | 17,233 |
| Evansville, Ind. & Terre Haute..... | Apr. 143 | 106,145 | 5,492 | 117,950 | 22,626 | 15,170 | 1,263 | 52,148 | 3,502 | 91,225 | 26,723 | 22,274 | -31,828 |
| Evansville, Ind. & Terre Haute..... | Apr. 139 | 554,848 | 29,870 | 606,657 | 110,484 | 63,180 | 7,626 | 249,401 | 13,587 | 430,707 | 175,950 | 156,455 | 49,086 |
| Florida East Coast..... | Apr. 763 | 1,169,998 | 272,849 | 1,887,096 | 224,471 | 271,389 | 15,381 | 603,090 | 36,652 | 1,170,218 | 716,878 | 607,006 | 579,966 |
| Florida East Coast..... | Apr. 763 | 4,382,097 | 2,847,292 | 8,219,652 | 933,286 | 1,074,931 | 84,000 | 2,547,830 | 135,190 | 1,863,493 | 3,356,159 | 2,951,829 | 2,608,042 |
| Ft. Smith & Western..... | Apr. 249 | 117,140 | 18,514 | 146,173 | 28,996 | 26,329 | 5,501 | 53,741 | 7,697 | 121,047 | 25,126 | 19,187 | 14,766 |
| Ft. Smith & Western..... | Apr. 249 | 420,212 | 78,368 | 536,921 | 120,792 | 109,420 | 20,990 | 123,682 | 31,375 | 492,349 | 44,564 | 20,280 | 47,766 |
| Galveston Wharf Co..... | Apr. 13 | ..... | ..... | 86,465 | 40,654 | 4,452 | ..... | 26,925 | 7,940 | 3,339 | 7,055 | -9,255 | 9,414 |
| Galveston Wharf Co..... | Apr. 13 | ..... | ..... | 403,384 | 162,951 | 17,500 | ..... | 113,869 | 11,327 | 325,734 | 80,800 | 10,365 | 60,948 |
| Georgia R. R..... | Apr. 328 | 360,847 | 96,086 | 493,874 | 57,213 | 93,225 | 21,340 | 204,193 | 21,708 | 397,676 | 96,198 | 89,419 | 102,805 |
| Georgia R. R..... | Apr. 328 | 1,466,182 | 377,625 | 1,985,212 | 370,965 | 88,339 | 88,339 | 859,192 | 86,174 | 1,505,565 | 389,707 | 361,476 | 312,352 |
| Georgia & Florida..... | Apr. 406 | 1,166,182 | 17,870 | 1,327,587 | 137,689 | 20,191 | 8,587 | 53,027 | 8,422 | 108,414 | 29,275 | 22,538 | 10,723 |
| Georgia & Florida..... | Apr. 406 | 486,289 | 74,170 | 595,521 | 84,445 | 71,903 | 32,698 | 228,606 | 32,216 | 450,762 | 144,759 | 118,608 | 67,820 |
| Grand Trunk Western..... | Apr. 347 | 1,327,587 | 154,746 | 1,560,056 | 426,379 | 1,760,921 | 42,533 | 607,631 | 52,432 | 1,533,564 | 216,692 | 143,374 | 382,783 |
| Grand Trunk Western..... | Apr. 347 | 5,405,450 | 671,586 | 6,428,332 | 519,983 | 1,760,921 | 144,164 | 2,994,921 | 200,267 | 5,297,700 | 1,130,832 | 848,516 | 596,212 |
| Atlantic & St. Lawrence..... | Apr. 166 | 206,751 | 35,368 | 275,152 | 70,730 | 43,899 | 5,170 | 125,504 | 8,175 | 234,980 | 172 | -91,362 | -55,982 |
| Atlantic & St. Lawrence..... | Apr. 166 | 784,619 | 134,564 | 955,859 | 156,256 | 196,806 | 23,831 | 582,961 | 42,430 | 1,009,584 | 103.10 | -30,725 | -605,714 |
| Chi., Det. & Canada Gr. Tr. Jct..... | Apr. 59 | 223,399 | 5,339 | 276,574 | 15,715 | 10,876 | 5,551 | 85,796 | 13,411 | 121,406 | 155,168 | 146,484 | 147,416 |
| Chi., Det. & Canada Gr. Tr. Jct..... | Apr. 59 | 912,315 | 34,284 | 1,104,347 | 53,703 | 50,979 | 21,721 | 206,699 | 17,027 | 501,310 | 460,312 | 569,274 | 439,805 |
| Det., Grand Haven & Milwaukee..... | Apr. 189 | 461,373 | 33,701 | 547,015 | 7,243 | 49,276 | 1,169 | 236,688 | 17,027 | 413,710 | 75.60 | 128,426 | 68,525 |
| Det., Grand Haven & Milwaukee..... | Apr. 189 | 1,858,333 | 163,171 | 2,196,809 | 266,482 | 216,700 | 31,698 | 1,043,009 | 61,340 | 1,640,325 | 538,206 | 187,936 | 47,250 |
| Great Northern..... | Apr. 825 | 5,594,019 | 1,000,111 | 7,463,432 | 1,331,452 | 3,881,280 | 188,375 | 2,897,682 | 203,728 | 5,984,170 | 1,379,262 | 526,288 | 432,512 |
| Great Northern..... | Apr. 825 | 21,252,153 | 4,095,417 | 28,497,012 | 3,692,728 | 5,690,013 | 61,391 | 12,319,921 | 883,126 | 23,526,689 | 5,144,329 | 2,277,692 | 1,534,206 |
| Green Bay & Western..... | Apr. 234 | 96,931 | 17,018 | 121,427 | 22,381 | 20,433 | 3,860 | 53,040 | 2,315 | 97,243 | 77.60 | 19,682 | 13,601 |
| Green Bay & Western..... | Apr. 234 | 400,378 | 76,013 | 505,698 | 71,977 | 85,163 | 12,942 | 190,213 | 10,033 | 373,508 | 133.90 | 102,366 | 48,446 |
| Gulf Coast Lines..... | Apr. 922 | 1,184,968 | 160,889 | 1,427,253 | 212,241 | 161,366 | 31,264 | 345,145 | 38,748 | 787,166 | 640,088 | 585,623 | 232,301 |
| Gulf Coast Lines..... | Apr. 922 | 3,851,105 | 712,379 | 4,821,669 | 708,364 | 588,926 | 113,815 | 1,388,042 | 146,442 | 2,703,178 | 2,028,492 | 1,810,975 | 943,530 |
| Gulf & Ship Island..... | Apr. 307 | 225,625 | 35,435 | 296,704 | 49,691 | 37,085 | 8,048 | 89,461 | 13,826 | 207,924 | 60,976 | 84,962 | 43,466 |
| Gulf & Ship Island..... | Apr. 307 | 924,825 | 154,442 | 1,201,766 | 188,080 | 159,125 | 31,561 | 363,180 | 55,374 | 838,981 | 362,785 | 210,729 | 186,215 |
| Gulf, Mobile & Northern..... | Apr. 465 | 453,075 | 38,008 | 510,930 | 71,461 | 75,847 | 21,106 | 159,006 | 20,050 | 372,383 | 62.99 | 118,795 | 89,637 |
| Gulf, Mobile & Northern..... | Apr. 465 | 1,781,241 | 167,431 | 2,026,696 | 311,882 | 402,507 | 89,014 | 659,062 | 76,148 | 1,436,036 | 590,650 | 474,616 | 341,902 |
| Hocking Valley..... | Apr. 348 | 1,190,426 | 172,729 | 1,664,790 | 138,889 | 406,718 | 14,489 | 408,025 | 38,644 | 1,426,220 | 312,670 | 244,707 | 298,873 |
| Hocking Valley..... | Apr. 348 | 4,473,824 | 313,903 | 5,093,289 | 509,946 | 1,507,859 | 31,561 | 1,657,015 | 144,630 | 3,869,818 | 76.00 | 1,223,471 | 891,203 |
| Illinois Central..... | Apr. 4,847 | 9,147,825 | 2,048,042 | 12,704,650 | 1,689,330 | 2,988,510 | 167,711 | 4,630,272 | 274,051 | 9,794,747 | 2,409,906 | 1,669,736 | 2,325,096 |
| Illinois Central..... | Apr. 4,847 | 39,108,765 | 8,924,464 | 51,596,064 | 6,091,781 | 11,196,432 | 792,226 | 19,836,026 | 1,268,965 | 39,319,128 | 76.20 | 8,752,279 | 9,509,787 |
| Yazoo & Mississippi Valley..... | Apr. 1,380 | 1,312,320 | 283,885 | 1,692,574 | 238,098 | 337,635 | 20,048 | 652,940 | 34,013 | 1,304,986 | 1,380,588 | 1,272,151 | 931,277 |
| Yazoo & Mississippi Valley..... | Apr. 1,380 | 5,322,141 | 1,260,537 | 6,943,992 | 1,022,002 | 1,198,448 | 33,990 | 2,327,578 | 171,804 | 5,213,704 | 1,730,288 | 1,268,603 | 295,499 |
| Illinois Central Combined Report..... | Apr. 6,227 | 10,461,345 | 2,331,927 | 13,897,224 | 1,947,431 | 3,326,145 | 187,759 | 5,283,212 | 308,064 | 11,099,733 | 79.90 | 2,797,491 | 2,231,819 |
| Illinois Central Combined Report..... | Apr. 6,227 | 49,430,906 | 10,185,001 | 58,545,907 | 7,113,783 | 12,994,469 | 884,616 | 22,568,604 | 1,440,769 | 44,532,832 | 14,007,224 | 10,370,882 | 9,805,286 |
| International & Great Northern..... | Apr. 1,159 | 928,454 | 188,161 | 1,271,484 | 239,165 | 248,806 | 33,622 | 500,031 | 50,186 | 1,069,345 | 84.09 | 107,242 | 47,991 |
| International & Great Northern..... | Apr. 1,159 | 3,885,617 | 801,372 | 5,264,975 | 1,021,207 | 998,337 | 140,210 | 2,127,470 | 199,419 | 4,443,385 | 821,590 | 681,886 | 345,654 |
| Kansas City, Mexico & Orient..... | Apr. 272 | 144,038 | 6,707 | 160,677 | 31,386 | 33,697 | 4,883 | 72,310 | 5,144 | 147,420 | 91.70 | 7,257 | -4,612 |
| Kansas City, Mexico & Orient..... | Apr. 272 | 538,615 | 27,755 | 592,244 | 128,838 | 149,043 | 19,681 | 274,538 | 22,103 | 547,223 | 100.30 | -1,570 | -63,196 |
| Kansas City, Mexico & Orient..... | Apr. 465 | 156,070 | 9,489 | 173,468 | 41,091 | 36,986 | 5,406 | 71,618 | 5,327 | 160,286 | 92.40 | 9,181 | -55,541 |
| Kansas City, Mexico & Orient..... | Apr. 465 | 566,202 | 43,037 | 636,518 | 142,330 | 136,988 | 20,792 | 279,061 | 22,214 | 600,887 | 94.40 | 19,591 | -32,002 |
| Kansas City Southern..... | Apr. 767 | 1,260,699 | 149,821 | 1,550,455 | 243,338 | 296,255 | 41,510 | 518,122 | 83,291 | 1,181,028 | 76.20 | 369,427 | 225,840 |
| Kansas City Southern..... | Apr. 767 | 4,922,336 | 626,519 | 6,049,967 | 888,700 | 1,126,595 | 158,556 | 2,070,974 | 299,884 | 4,341,313 | 1,508,653 | 1,155,303 | 1,074,701 |
| Texasarkana & Ft. Smith..... | Apr. 81 | 220,739 | 25,345 | 251,301 | 23,552 | 23,552 | 5,002 | 67,211 | 10,603 | 128,536 | 51.10 | 122,765 | 74,793 |
| Texasarkana & Ft. Smith..... | Apr. 81 | 837,237 | 56,987 | 970,385 | 69,893 | 82,494 | 19,074 | 251,590 | 39,099 | 468,000 | 48.20 | 351,059 | 261,945 |
| Kansas, Oklahoma & Gulf..... | Apr. 314 | 132,505 | 47,463 | 36,994 | 32,488 | 33,488 | 8,169 | 62,630 | 12,494 | 153,800 | 104.30 | -16,733 | 27,266 |
| Kansas, Oklahoma & Gulf..... | Apr. 314 | 655,973 | 82,661 | 723,465 | 159,522 | 192,626 | 34,337 | 285,056 | 49,754 | 649,411 | 89.80 | 32,227 | 98,830 |
| Lake Superior & Ishpeming..... | Apr. 163 | 84,633 | 6,474 | 98,668 | 29,415 | 29,024 | 4,97 | 36,417 | 4,375 | 98,668 | 101.30 | -1,146 | 41,146 |
| Lake Superior & Ishpeming..... | Apr. 163 | 284,371 | 26,106 | 329,437 | 114,483 | 114,483 | 2,117 | 148,335 | 21,790 | 399,957 | -70 | -11,154 | -184,962 |

REVENUES AND EXPENSES OF RAILWAYS

Average mileage

| MONTH OF APRIL AND FOUR MONTHS OF CALENDAR YEAR 1924—CONTINUED | | | | | | | | | | | | | | | |
|--|--|---|--|----------|--|------------|--|---------------------------|--|---------------------|--|----------|--|--------|--|
| Name of road. | | Average mileage operated during period. | | Freight. | | Passenger. | | Total operating revenues. | | Operating expenses. | | General. | | Total. | |
| Name of road. | | Average mileage operated during period. | | Freight. | | Passenger. | | Total operating revenues. | | Operating expenses. | | General. | | Total. | |
| Name of road. | | Average mileage operated during period. | | Freight. | | Passenger. | | Total operating revenues. | | Operating expenses. | | General. | | Total. | |
| Name of road. | | Average mileage operated during period. | | Freight. | | Passenger. | | Total operating revenues. | | Operating expenses. | | General. | | Total. | |
| Name of road. | | Average mileage operated during period. | | Freight. | | Passenger. | | Total operating revenues. | | Operating expenses. | | General. | | Total. | |
| Name of road. | | Average mileage operated during period. | | Freight. | | Passenger. | | Total operating revenues. | | Operating expenses. | | General. | | Total. | |
| Name of road. | | Average mileage operated during period. | | Freight. | | Passenger. | | Total operating revenues. | | Operating expenses. | | General. | | Total. | |
| Name of road. | | Average mileage operated during period. | | Freight. | | Passenger. | | Total operating revenues. | | Operating expenses. | | General. | | Total. | |
| Name of road. | | Average mileage operated during period. | | Freight. | | Passenger. | | Total operating revenues. | | Operating expenses. | | General. | | Total. | |
| Name of road. | | Average mileage operated during period. | | Freight. | | Passenger. | | Total operating revenues. | | Operating expenses. | | General. | | Total. | |
| Name of road. | | Average mileage operated during period. | | Freight. | | Passenger. | | Total operating revenues. | | Operating expenses. | | General. | | Total. | |
| Name of road. | | Average mileage operated during period. | | Freight. | | Passenger. | | Total operating revenues. | | Operating expenses. | | General. | | Total. | |
| Name of road. | | Average mileage operated during period. | | Freight. | | Passenger. | | Total operating revenues. | | Operating expenses. | | General. | | Total. | |
| Name of road. | | Average mileage operated during period. | | Freight. | | Passenger. | | Total operating revenues. | | Operating expenses. | | General. | | Total. | |
| Name of road. | | Average mileage operated during period. | | Freight. | | Passenger. | | Total operating revenues. | | Operating expenses. | | General. | | Total. | |
| Name of road. | | Average mileage operated during period. | | Freight. | | Passenger. | | Total operating revenues. | | Operating expenses. | | General. | | Total. | |
| Name of road. | | Average mileage operated during period. | | Freight. | | Passenger. | | Total operating revenues. | | Operating expenses. | | General. | | Total. | |
| Name of road. | | Average mileage operated during period. | | Freight. | | Passenger. | | Total operating revenues. | | Operating expenses. | | General. | | Total. | |
| Name of road. | | Average mileage operated during period. | | Freight. | | Passenger. | | Total operating revenues. | | Operating expenses. | | General. | | Total. | |
| Name of road. | | Average mileage operated during period. | | Freight. | | Passenger. | | Total operating revenues. | | Operating expenses. | | General. | | Total. | |
| Name of road. | | Average mileage operated during period. | | Freight. | | Passenger. | | Total operating revenues. | | Operating expenses. | | General. | | Total. | |
| Name of road. | | Average mileage operated during period. | | Freight. | | Passenger. | | Total operating revenues. | | Operating expenses. | | General. | | Total. | |
| Name of road. | | Average mileage operated during period. | | Freight. | | Passenger. | | Total operating revenues. | | Operating expenses. | | General. | | Total. | |
| Name of road. | | Average mileage operated during period. | | Freight. | | Passenger. | | Total operating revenues. | | Operating expenses. | | General. | | Total. | |
| Name of road. | | Average mileage operated during period. | | Freight. | | Passenger. | | Total operating revenues. | | Operating expenses. | | General. | | Total. | |
| Name of road. | | Average mileage operated during period. | | Freight. | | Passenger. | | Total operating revenues. | | Operating expenses. | | General. | | Total. | |
| Name of road. | | Average mileage operated during period. | | Freight. | | Passenger. | | Total operating revenues. | | Operating expenses. | | General. | | Total. | |
| Name of road. | | Average mileage operated during period. | | Freight. | | Passenger. | | Total operating revenues. | | Operating expenses. | | General. | | Total. | |
| Name of road. | | Average mileage operated during period. | | Freight. | | Passenger. | | Total operating revenues. | | Operating expenses. | | General. | | Total. | |
| Name of road. | | Average mileage operated during period. | | Freight. | | Passenger. | | Total operating revenues. | | Operating expenses. | | General. | | Total. | |
| Name of road. | | Average mileage operated during period. | | Freight. | | Passenger. | | Total operating revenues. | | Operating expenses. | | General. | | Total. | |
| Name of road. | | Average mileage operated during period. | | Freight. | | Passenger. | | Total operating revenues. | | Operating expenses. | | General. | | Total. | |
| Name of road. | | Average mileage operated during period. | | Freight. | | Passenger. | | Total operating revenues. | | Operating expenses. | | General. | | Total. | |
| Name of road. | | Average mileage operated during period. | | Freight. | | Passenger. | | Total operating revenues. | | Operating expenses. | | General. | | Total. | |
| Name of road. | | Average mileage operated during period. | | Freight. | | Passenger. | | Total operating revenues. | | Operating expenses. | | General. | | Total. | |
| Name of road. | | Average mileage operated during period. | | Freight. | | Passenger. | | Total operating revenues. | | Operating expenses. | | General. | | Total. | |
| Name of road. | | Average mileage operated during period. | | Freight. | | Passenger. | | Total operating revenues. | | Operating expenses. | | General. | | Total. | |
| Name of road. | | Average mileage operated during period. | | Freight. | | Passenger. | | Total operating revenues. | | Operating expenses. | | General. | | Total. | |
| Name of road. | | Average mileage operated during period. | | Freight. | | Passenger. | | Total operating revenues. | | Operating expenses. | | General. | | Total. | |
| Name of road. | | Average mileage operated during period. | | Freight. | | Passenger. | | Total operating revenues. | | Operating expenses. | | General. | | Total. | |
| Name of road. | | Average mileage operated during period. | | Freight. | | Passenger. | | Total operating revenues. | | Operating expenses. | | General. | | Total. | |
| Name of road. | | Average mileage operated during period. | | Freight. | | Passenger. | | Total operating revenues. | | Operating expenses. | | General. | | Total. | |
| Name of road. | | Average mileage operated during period. | | Freight. | | Passenger. | | Total operating revenues. | | Operating expenses. | | General. | | Total. | |
| Name of road. | | Average mileage operated during period. | | Freight. | | Passenger. | | Total operating revenues. | | Operating expenses. | | General. | | Total. | |
| Name of road. | | Average mileage operated during period. | | Freight. | | Passenger. | | Total operating revenues. | | Operating expenses. | | General. | | Total. | |
| Name of road. | | Average mileage operated during period. | | Freight. | | Passenger. | | Total operating revenues. | | Operating expenses. | | General. | | Total. | |
| Name of road. | | Average mileage operated during period. | | Freight. | | Passenger. | | Total operating revenues. | | Operating expenses. | | General. | | Total. | |
| Name of road. | | Average mileage operated during period. | | Freight. | | Passenger. | | Total operating revenues. | | Operating expenses. | | General. | | Total. | |
| Name of road. | | Average mileage operated during period. | | Freight. | | Passenger. | | Total operating revenues. | | Operating expenses. | | General. | | Total. | |
| Name of road. | | Average mileage operated during period. | | Freight. | | Passenger. | | Total operating revenues. | | Operating expenses. | | General. | | Total. | |
| Name of road. | | Average mileage operated during period. | | Freight. | | Passenger. | | Total operating revenues. | | Operating expenses. | | General. | | Total. | |
| Name of road. | | Average mileage operated during period. | | Freight. | | Passenger. | | Total operating revenues. | | Operating expenses. | | General. | | Total. | |
| Name of road. | | Average mileage operated during period. | | Freight. | | Passenger. | | Total operating revenues. | | Operating expenses. | | General. | | Total. | |
| Name of road. | | Average mileage operated during period. | | Freight. | | Passenger. | | Total operating revenues. | | Operating expenses. | | General. | | Total. | |
| Name of road. | | Average mileage operated during period. | | Freight. | | Passenger. | | Total operating revenues. | | Operating expenses. | | General. | | Total. | |
| Name of road. | | Average mileage operated during period. | | Freight. | | Passenger. | | Total operating revenues. | | Operating expenses. | | General. | | Total. | |
| Name of road. | | Average mileage operated during period. | | Freight. | | Passenger. | | Total operating revenues. | | Operating expenses. | | General. | | Total. | |
| Name of road. | | Average mileage operated during period. | | Freight. | | Passenger. | | Total operating revenues. | | Operating expenses. | | General. | | Total. | |
| Name of road. | | Average mileage operated during period. | | Freight. | | Passenger. | | Total operating revenues. | | Operating expenses. | | General. | | Total. | |
| Name of road. | | Average mileage operated during period. | | Freight. | | Passenger. | | Total operating revenues. | | Operating expenses. | | General. | | Total. | |
| Name of road. | | Average mileage operated during period. | | Freight. | | Passenger. | | Total operating revenues. | | Operating expenses. | | General. | | Total. | |
| Name of road. | | Average mileage operated during period. | | Freight. | | Passenger. | | Total operating revenues. | | Operating expenses. | | General. | | Total. | |
| Name of road. | | Average mileage operated during period. | | Freight. | | Passenger. | | Total operating revenues. | | Operating expenses. | | General. | | Total. | |
| Name of road. | | Average mileage operated during period. | | Freight. | | Passenger. | | Total operating revenues. | | Operating expenses. | | General. | | Total. | |
| Name of road. | | Average mileage operated during period. | | Freight. | | Passenger. | | Total operating revenues. | | Operating expenses. | | General. | | Total. | |
| Name of road. | | Average mileage operated during period. | | Freight. | | Passenger. | | Total operating revenues. | | Operating expenses. | | General. | | Total. | |
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| Name of road. | | Average mileage operated during period. | | Freight. | | Passenger. | | Total operating revenues. | | Operating expenses. | | General. | | | |

June 14, 1924

RAILWAY AGE

1531

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF APRIL AND FOUR MONTHS OF CALENDAR YEAR 1924—CONTINUED

| Name of road. | Average mileage operated during period. | Operating revenues | | | Operating expenses | | | Operating ratio. | Net from railway operation. | Operating (or loss). | Net operating income. | Net income 1922. |
|------------------------------------|---|--------------------|------------|--------------|----------------------------|-----------------------------|-----------|------------------|-----------------------------|----------------------|-----------------------|------------------|
| | | Freight. | Passenger. | (Inc. misc.) | Way and equip. structures. | Maintenance of equip. ment. | Traffic. | | | | | |
| New York, New Haven, & Hartford. | 1,987 | 5,395,974 | 4,057,668 | \$10,671,524 | \$1,274,416 | \$2,446,002 | \$7,026 | 76.00 | \$2,558,884 | \$2,158,631 | \$1,751,622 | \$1,152,165 |
| Central New England. | 1,997 | 20,886,113 | 15,671,563 | 41,339,239 | 3,315,941 | 9,515,941 | 238,105 | 77.80 | 9,186,317 | 6,094,502 | 6,094,502 | 900,543 |
| New York Connecting. | 4 mos. | 2,533,340 | 53,367 | 2,674,565 | 383,713 | 495,490 | 19,666 | 69.80 | 208,117 | 182,417 | 529,435 | 141,185 |
| New York, Ontario & Western. | 4 mos. | 6,751,457 | 2,910,433 | 31,670,163 | 1,160,999 | 484,542 | 99,313 | 68.20 | 172,051 | 121,817 | 11,826 | 207,970 |
| Norfolk & Western. | 4 mos. | 2,240 | 27,742,063 | 389,100 | 3,310,192 | 435,305 | 15,618 | 36.70 | 134,223 | 518,951 | 373,048 | 517,218 |
| Norfolk Southern. | 4 mos. | 6,669 | 5,612,929 | 969,523 | 2,309,212 | 1,334,448 | 86,557 | 36.70 | 148,877 | 148,877 | 373,048 | 31,646 |
| Norfolk Pacific. | 4 mos. | 6,669 | 21,740,428 | 1,845,578 | 537,923 | 1,114,470 | 15,618 | 63.20 | 2,159,323 | 1,483,503 | 518,951 | 88,592 |
| Northwestern Pacific. | 4 mos. | 496 | 1,130,103 | 688,558 | 2,631,694 | 456,988 | 61,618 | 73.30 | 2,159,323 | 1,483,503 | 518,951 | 88,592 |
| Pennsylvania. | 4 mos. | 10,510 | 35,579,637 | 12,332,070 | 4,924,456 | 13,514,918 | 15,618 | 82.60 | 1,721,016 | 598,575 | 1,042,999 | 933,349 |
| Baltimore, Chesapeake & Atlantic. | 4 mos. | 87 | 258,397 | 27,116 | 360,763 | 405,272 | 21,584 | 78.90 | 11,129,038 | 8,617,276 | 25,211,036 | 24,903,027 |
| Long Island. | 4 mos. | 397 | 932,420 | 1,555,335 | 2,723,759 | 1,346,473 | 19,207 | 81.20 | 39,871,477 | 31,713,091 | 8,168,381 | 171,389 |
| West Jersey & Seashore. | 4 mos. | 397 | 3,340,042 | 5,723,164 | 971,681 | 524,965 | 15,618 | 81.20 | 39,871,477 | 31,713,091 | 8,168,381 | 171,389 |
| Peoria & Pekin Union. | 4 mos. | 359 | 1,324,976 | 1,852,151 | 3,472,715 | 524,965 | 15,618 | 81.20 | 39,871,477 | 31,713,091 | 8,168,381 | 171,389 |
| Pere Marquette. | 4 mos. | 102 | 70,439 | 26,568 | 79,992 | 20,239 | 38,024 | 78.10 | 30,922 | 140,365 | 227,273 | 216,445 |
| Pittsburgh & Shawmut. | 4 mos. | 102 | 311,707 | 9,474 | 292,156 | 78,098 | 81,921 | 78.10 | 30,922 | 140,365 | 227,273 | 216,445 |
| Pittsburgh & West Virginia. | 4 mos. | 92 | 248,019 | 35,814 | 1,229,302 | 106,848 | 18,084 | 78.10 | 30,922 | 140,365 | 227,273 | 216,445 |
| Pittsburgh, Shawmut & Northern. | 4 mos. | 210 | 390,346 | 28,138 | 435,719 | 85,250 | 18,411 | 78.10 | 30,922 | 140,365 | 227,273 | 216,445 |
| Quincy, Omaha & Kansas City. | 4 mos. | 119 | 6,434,179 | 3,349,903 | 304,283 | 117,882 | 13,374 | 78.10 | 30,922 | 140,365 | 227,273 | 216,445 |
| Reading Company. | 4 mos. | 170 | 455,375 | 530,829 | 1,043,561 | 432,655 | 125,837 | 78.10 | 30,922 | 140,365 | 227,273 | 216,445 |
| Atlantic City. | 4 mos. | 41 | 83,407 | 5,579 | 92,444 | 7,598 | 5,039 | 78.10 | 30,922 | 140,365 | 227,273 | 216,445 |
| Perkiomen. | 4 mos. | 41 | 338,443 | 21,509 | 375,121 | 26,783 | 19,346 | 78.10 | 30,922 | 140,365 | 227,273 | 216,445 |
| Port Reading. | 4 mos. | 21 | 498,622 | 21,509 | 637,672 | 95,329 | 21,953 | 78.10 | 30,922 | 140,365 | 227,273 | 216,445 |
| Richm'd, Fredericksburg & Potomac. | 4 mos. | 117 | 1,882,885 | 1,583,632 | 4,169,006 | 455,343 | 107,113 | 78.10 | 30,922 | 140,365 | 227,273 | 216,445 |
| Rutland. | 4 mos. | 413 | 320,629 | 115,921 | 446,759 | 349,002 | 426,753 | 78.10 | 30,922 | 140,365 | 227,273 | 216,445 |
| St. Louis, San Francisco. | 4 mos. | 474 | 4,813,103 | 1,336,887 | 6,708,965 | 3,099,146 | 22,810 | 78.10 | 30,922 | 140,365 | 227,273 | 216,445 |
| St. Louis & Rio Grande. | 4 mos. | 235 | 1,728,733 | 22,504 | 1,751,237 | 1,751,237 | 1,751,237 | 78.10 | 30,922 | 140,365 | 227,273 | 216,445 |
| Ft. Worth & Rio Grande. | 4 mos. | 235 | 1,728,733 | 22,504 | 1,751,237 | 1,751,237 | 1,751,237 | 78.10 | 30,922 | 140,365 | 227,273 | 216,445 |
| St. Louis, San Francisco & Texas. | 4 mos. | 134 | 119,846 | 12,570 | 132,416 | 16,638 | 96,233 | 78.10 | 30,922 | 140,365 | 227,273 | 216,445 |
| St. Louis, Southwestern. | 4 mos. | 969 | 1,569,793 | 601,653 | 6,121,000 | 761,625 | 1,409,942 | 78.10 | 30,922 | 140,365 | 227,273 | 216,445 |
| St. Louis, Southwestern of Texas. | 4 mos. | 807 | 1,569,793 | 601,653 | 6,121,000 | 761,625 | 1,409,942 | 78.10 | 30,922 | 140,365 | 227,273 | 216,445 |
| St. Antonio & Aransas Pass. | 4 mos. | 317 | 105,645 | 18,858 | 124,503 | 13,708 | 90,047 | 78.10 | 30,922 | 140,365 | 227,273 | 216,445 |
| San Antonio & Uvalde & Gulf. | 4 mos. | 317 | 366,315 | 80,005 | 446,320 | 63,363 | 17,571 | 78.10 | 30,922 | 140,365 | 227,273 | 216,445 |
| Seaboard Air Line. | 4 mos. | 3,571 | 8,508,778 | 2,441,668 | 11,908,579 | 1,635,828 | 2,043,698 | 78.10 | 30,922 | 140,365 | 227,273 | 216,445 |
| Southern Ry. | 4 mos. | 6,849 | 33,219,516 | 9,973,466 | 46,904,974 | 122,289 | 745,830 | 78.10 | 30,922 | 140,365 | 227,273 | 216,445 |
| Alabama Great Southern. | 4 mos. | 318 | 2,455,528 | 626,442 | 3,081,970 | 474,085 | 81,231 | 78.10 | 30,922 | 140,365 | 227,273 | 216,445 |

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF APRIL AND FOUR MONTHS OF CALENDAR YEAR 1924—CONTINUED

Average mileage operated during period.

Name of road.

Cin., New Orleans & Tex. Pacific, Apr. 338

Georgia, Southern & Florida, Apr. 338

New Orleans & Northeastern, Apr. 401

| Name of road. | Average mileage operated during period. | Operating revenues | | | | Operating expenses | | | | General. | Total. | Operating ratio. | Net from railway operation. | Operating income (or loss). | Net operating income. | Net income 1923. |
|---|---|--------------------|-------------|--------------|------------------------------------|--------------------|-----------------|-------------|--------------|--------------|--------------|------------------|-----------------------------|-----------------------------|-----------------------|------------------|
| | | Freight. | Passenger. | Total. | Maintenance of way and structures. | Traffic. | Transportation. | General. | Total. | | | | | | | |
| Cin., New Orleans & Tex. Pacific, Apr. 338 | 338 | \$1,411,916 | \$340,451 | \$1,752,367 | \$289,002 | \$43,287 | \$547,693 | \$46,721 | \$1,293,568 | \$1,740,289 | \$1,740,289 | 69.30 | \$1,046,721 | \$703,568 | \$1,046,721 | \$1,046,721 |
| Georgia, Southern & Florida, Apr. 338 | 338 | \$5,488,088 | \$1,440,270 | \$6,928,358 | \$1,095,343 | \$1,034 | \$2,213,873 | \$182,695 | \$5,263,226 | \$6,458,240 | \$6,458,240 | 71.30 | \$2,113,620 | \$557,965 | \$2,113,620 | \$2,113,620 |
| New Orleans & Northeastern, Apr. 401 | 401 | \$265,862 | \$9,118 | \$274,980 | \$70,619 | \$1,034 | \$167,126 | \$43,901 | \$1,254,485 | \$1,308,485 | \$1,308,485 | 80.80 | \$380,108 | \$78,664 | \$380,108 | \$380,108 |
| Northern Alabama, Apr. 207 | 207 | \$337,858 | \$77,351 | \$415,209 | \$1,496 | \$1,861 | \$11,991 | \$130,657 | \$153,333 | \$153,333 | \$153,333 | 69.80 | \$116,060 | \$95,928 | \$116,060 | \$116,060 |
| Southern Pacific, Apr. 207 | 207 | \$1,469,227 | \$721,528 | \$2,190,755 | \$280,060 | \$361,707 | \$43,779 | \$592,329 | \$1,353,637 | \$1,353,637 | \$1,353,637 | 70.30 | \$70,913 | \$412,243 | \$70,913 | \$70,913 |
| Arizona Eastern, Apr. 110 | 110 | \$109,028 | \$12,757 | \$121,785 | \$23,326 | \$2,711 | \$3,779 | \$3,216 | \$76,578 | \$79,794 | \$79,794 | 61.20 | \$48,595 | \$39,564 | \$48,595 | \$48,595 |
| Atlantic Steamship Lines, Apr. 7, 164 | 164 | \$10,183,777 | \$3,499,608 | \$13,683,385 | \$15,333,228 | \$2,063,291 | \$2,391,666 | \$1,146,200 | \$10,572,929 | \$11,719,855 | \$11,719,855 | 69.00 | \$1,760,440 | \$3,441,095 | \$1,760,440 | \$1,760,440 |
| Galveston, Harrisburg & San Antonio, Apr. 382 | 382 | \$971,528 | \$114,229 | \$1,085,757 | \$260,548 | \$9,355 | \$1,146,200 | \$3,372 | \$2,391,666 | \$2,391,666 | \$2,391,666 | 70.30 | \$70,913 | \$412,243 | \$70,913 | \$70,913 |
| Houston & Texas Central, Apr. 1,379 | 1,379 | \$3,498,645 | \$195,127 | \$3,693,772 | \$1,444,749 | \$14,595 | \$269,733 | \$1,496 | \$10,572,929 | \$11,719,855 | \$11,719,855 | 69.00 | \$1,760,440 | \$3,441,095 | \$1,760,440 | \$1,760,440 |
| Houston, East & West Texas, Apr. 923 | 923 | \$851,596 | \$242,023 | \$1,093,619 | \$447,821 | \$406,263 | \$27,742 | \$81,856 | \$1,719,855 | \$1,719,855 | \$1,719,855 | 73.80 | \$1,046,721 | \$703,568 | \$1,046,721 | \$1,046,721 |
| Louisiana Western, Apr. 191 | 191 | \$196,230 | \$40,583 | \$236,813 | \$1,324,221 | \$238,287 | \$24,557 | \$410,458 | \$1,962 | \$1,962 | \$1,962 | 88.60 | \$1,046,721 | \$703,568 | \$1,046,721 | \$1,046,721 |
| Morgan's L. & T. R. R. & S. Co., Apr. 207 | 207 | \$232,309 | \$77,822 | \$310,131 | \$1,324,221 | \$238,287 | \$24,557 | \$410,458 | \$1,962 | \$1,962 | \$1,962 | 88.60 | \$1,046,721 | \$703,568 | \$1,046,721 | \$1,046,721 |
| Texas & New Orleans, Apr. 400 | 400 | \$1,907,189 | \$131,009 | \$2,038,198 | \$1,324,221 | \$238,287 | \$24,557 | \$410,458 | \$1,962 | \$1,962 | \$1,962 | 88.60 | \$1,046,721 | \$703,568 | \$1,046,721 | \$1,046,721 |
| Spokane International, Apr. 507 | 507 | \$559,938 | \$154,163 | \$714,101 | \$1,324,221 | \$238,287 | \$24,557 | \$410,458 | \$1,962 | \$1,962 | \$1,962 | 88.60 | \$1,046,721 | \$703,568 | \$1,046,721 | \$1,046,721 |
| Spokane, Portland & Seattle, Apr. 165 | 165 | \$2,122,204 | \$441,066 | \$2,563,270 | \$1,324,221 | \$238,287 | \$24,557 | \$410,458 | \$1,962 | \$1,962 | \$1,962 | 88.60 | \$1,046,721 | \$703,568 | \$1,046,721 | \$1,046,721 |
| Tennessee Central, Apr. 554 | 554 | \$486,001 | \$112,652 | \$598,653 | \$1,324,221 | \$238,287 | \$24,557 | \$410,458 | \$1,962 | \$1,962 | \$1,962 | 88.60 | \$1,046,721 | \$703,568 | \$1,046,721 | \$1,046,721 |
| Terminal Railroad Assn. of St. L., Apr. 286 | 286 | \$1,954,120 | \$464,824 | \$2,418,944 | \$1,324,221 | \$238,287 | \$24,557 | \$410,458 | \$1,962 | \$1,962 | \$1,962 | 88.60 | \$1,046,721 | \$703,568 | \$1,046,721 | \$1,046,721 |
| East St. Louis Connecting, Apr. 296 | 296 | \$678,722 | \$159,887 | \$838,609 | \$1,324,221 | \$238,287 | \$24,557 | \$410,458 | \$1,962 | \$1,962 | \$1,962 | 88.60 | \$1,046,721 | \$703,568 | \$1,046,721 | \$1,046,721 |
| St. Louis Merchants' Bridge Term., Apr. 37 | 37 | ..... | ..... | ..... | \$1,324,221 | \$238,287 | \$24,557 | \$410,458 | \$1,962 | \$1,962 | \$1,962 | 88.60 | \$1,046,721 | \$703,568 | \$1,046,721 | \$1,046,721 |
| St. Louis Transfer, Apr. 1 | 1 | ..... | ..... | ..... | \$1,324,221 | \$238,287 | \$24,557 | \$410,458 | \$1,962 | \$1,962 | \$1,962 | 88.60 | \$1,046,721 | \$703,568 | \$1,046,721 | \$1,046,721 |
| Texas & Pacific, Apr. 6 | 6 | ..... | ..... | ..... | \$1,324,221 | \$238,287 | \$24,557 | \$410,458 | \$1,962 | \$1,962 | \$1,962 | 88.60 | \$1,046,721 | \$703,568 | \$1,046,721 | \$1,046,721 |
| Toledo, Peoria & Western, Apr. 1,952 | 1,952 | \$736,042 | \$53,451 | \$789,493 | \$1,324,221 | \$238,287 | \$24,557 | \$410,458 | \$1,962 | \$1,962 | \$1,962 | 88.60 | \$1,046,721 | \$703,568 | \$1,046,721 | \$1,046,721 |
| Trinity & Brazos Valley, Apr. 247 | 247 | \$105,510 | \$38,323 | \$143,833 | \$1,324,221 | \$238,287 | \$24,557 | \$410,458 | \$1,962 | \$1,962 | \$1,962 | 88.60 | \$1,046,721 | \$703,568 | \$1,046,721 | \$1,046,721 |
| Union Railroad of Penna., Apr. 368 | 368 | \$149,814 | \$17,351 | \$167,165 | \$1,324,221 | \$238,287 | \$24,557 | \$410,458 | \$1,962 | \$1,962 | \$1,962 | 88.60 | \$1,046,721 | \$703,568 | \$1,046,721 | \$1,046,721 |
| Union Pacific, Apr. 45 | 45 | ..... | ..... | ..... | \$1,324,221 | \$238,287 | \$24,557 | \$410,458 | \$1,962 | \$1,962 | \$1,962 | 88.60 | \$1,046,721 | \$703,568 | \$1,046,721 | \$1,046,721 |
| Oregon Short Line, Apr. 3,714 | 3,714 | \$5,705,275 | \$1,328,400 | \$7,033,675 | \$1,324,221 | \$238,287 | \$24,557 | \$410,458 | \$1,962 | \$1,962 | \$1,962 | 88.60 | \$1,046,721 | \$703,568 | \$1,046,721 | \$1,046,721 |
| Oregon-Wash. R. R. & Nav. Co., Apr. 2,363 | 2,363 | \$2,249,473 | \$361,049 | \$2,610,522 | \$1,324,221 | \$238,287 | \$24,557 | \$410,458 | \$1,962 | \$1,962 | \$1,962 | 88.60 | \$1,046,721 | \$703,568 | \$1,046,721 | \$1,046,721 |
| St. Joseph & Grand Island, Apr. 2,231 | 2,231 | \$1,772,464 | \$148,456 | \$1,920,920 | \$1,324,221 | \$238,287 | \$24,557 | \$410,458 | \$1,962 | \$1,962 | \$1,962 | 88.60 | \$1,046,721 | \$703,568 | \$1,046,721 | \$1,046,721 |
| Utah, Apr. 258 | 258 | \$119,115 | \$154,703 | \$273,818 | \$1,324,221 | \$238,287 | \$24,557 | \$410,458 | \$1,962 | \$1,962 | \$1,962 | 88.60 | \$1,046,721 | \$703,568 | \$1,046,721 | \$1,046,721 |
| Virginian, Apr. 258 | 258 | \$119,115 | \$154,703 | \$273,818 | \$1,324,221 | \$238,287 | \$24,557 | \$410,458 | \$1,962 | \$1,962 | \$1,962 | 88.60 | \$1,046,721 | \$703,568 | \$1,046,721 | \$1,046,721 |
| Wabash, Apr. 102 | 102 | ..... | ..... | ..... | \$1,324,221 | \$238,287 | \$24,557 | \$410,458 | \$1,962 | \$1,962 | \$1,962 | 88.60 | \$1,046,721 | \$703,568 | \$1,046,721 | \$1,046,721 |
| Western Maryland, Apr. 545 | 545 | \$1,422,684 | \$374,354 | \$1,797,038 | \$1,324,221 | \$238,287 | \$24,557 | \$410,458 | \$1,962 | \$1,962 | \$1,962 | 88.60 | \$1,046,721 | \$703,568 | \$1,046,721 | \$1,046,721 |
| Western Pacific, Apr. 2,486 | 2,486 | \$4,189,618 | \$741,409 | \$4,931,027 | \$1,324,221 | \$238,287 | \$24,557 | \$410,458 | \$1,962 | \$1,962 | \$1,962 | 88.60 | \$1,046,721 | \$703,568 | \$1,046,721 | \$1,046,721 |
| Wheeling & Lake Erie, Apr. 804 | 804 | \$1,422,684 | \$374,354 | \$1,797,038 | \$1,324,221 | \$238,287 | \$24,557 | \$410,458 | \$1,962 | \$1,962 | \$1,962 | 88.60 | \$1,046,721 | \$703,568 | \$1,046,721 | \$1,046,721 |
| Wheeling & Lake Erie, Apr. 1,042 | 1,042 | \$810,367 | \$82,997 | \$893,364 | \$1,324,221 | \$238,287 | \$24,557 | \$410,458 | \$1,962 | \$1,962 | \$1,962 | 88.60 | \$1,046,721 | \$703,568 | \$1,046,721 | \$1,046,721 |
| Wheeling & Lake Erie, Apr. 511 | 511 | \$1,376,414 | \$232,048 | \$1,608,462 | \$1,324,221 | \$238,287 | \$24,557 | \$410,458 | \$1,962 | \$1,962 | \$1,962 | 88.60 | \$1,046,721 | \$703,568 | \$1,046,721 | \$1,046,721 |

Safety Section Annual Meeting

The Safety Section of the Operating Division of the American Railway Association will hold its fourth annual meeting at Newhouse Hotel, Salt Lake City, Utah, on Tuesday, Wednesday and Thursday, June 24, 25 and 26. Following the usual opening proceedings, with the report of the Committee of Direction, presented by Isaiah Hale (A. T. & S. F.), chairman, there will be an address by R. H. Aishton, president of the American Railway Association, and the report of the Committee on Statistics will be presented by T. H. Carrow (Penn.).

The other committee reports are as follows: Highway Crossing Accidents, H. A. Rowe, chairman, and C. E. Hill (N. Y. C.); Publicity and Education, Isaiah Hale; Contributions for Brotherhood Magazines, L. F. Shedd (C. R. I. & P.); Affiliation with Local Safety Councils, E. R. Cott (H. V.).

Six addresses by persons not members of the section are scheduled, as follows: Tuesday afternoon, Thomas E. McKay, president of the Public Utilities Commission of Utah; Wednesday morning, C. R. Gray, president of the Union Pacific; T. C. Gussman, vice-president of the Brotherhood of Railway Trackmen, etc., and T. H. Beacom, receiver of the Denver & Rio Grande Western; Wednesday afternoon, Lew R. Palmer, Equitable Life Assurance Society; Thursday morning, Richard R. Lyman, national executive of the Boy Scouts of America; Thursday afternoon, P. A. Simpkins, railroad evangelist.

The program calls for round-table discussions on transportation accidents, on accidents to trackmen, bridge men and building men and accidents in the mechanical department.

Pennsylvania Asks Test of Its Train Control

President Rea, of the Pennsylvania, has filed a petition with the Interstate Commerce Commission asking that the commission make an inspection and test of the automatic train control apparatus installed on its Lewistown division, 49 miles, to the end that the device may be formally approved by the commission before the company is required to proceed at great expense with the installation of similar devices upon other parts of its road as required by the commission's orders of June 13, 1922, and January 14, 1924. The petition also asks an extension of time in which to make the installations designated, in the event that the device installed on the Lewistown division is formally approved, on the ground that it will be physically impossible to complete the installations within the time fixed and that, because of the excessive cost, such installations should be spread over a greater period of time.

The company has expended approximately \$350,000 on the Lewistown division installation, the petition says, and the device has been in actual service for all trains over the division since July 11, 1923. The company had requested the commission to inspect and test the installation, both by letter and by petition, but the petition was formally denied on September 26, 1923. The company is now engaged in developing the device, the petition says, and submits that it should be inspected, not only in justice to the petitioner but for the information of the commission with a view to the development of the art of train control.

The company estimates the cost of equipping all its lines with the induction type of train control, which it believes to be the only safe and practical one, at \$115,000,000; the cost for its line from Baltimore to Harrisburg at \$1,758,679, and for the West Jersey & Seashore between Camden and Atlantic City at \$1,077,503.

Traffic News

The Norfolk Division of the Pennsylvania Railroad reports the total number of freight cars moved to and from Norfolk on May 18 as 1,171; the work done by 10 tugs making 46 trips across Chesapeake Bay. The distance, Cape Charles to Norfolk, is 36 miles.

The New York Central and the Delaware & Hudson announce an additional through night train between New York and Montreal, to be somewhat faster than the existing trains. Northbound the new train will leave New York at 9:45 p. m. and arrive in Montreal 7:50 a. m. The train will have sleeping cars which will run over the Canadian Pacific, to and from Quebec and to and from Ottawa via Montreal.

South Carolina's Cabbage Patch

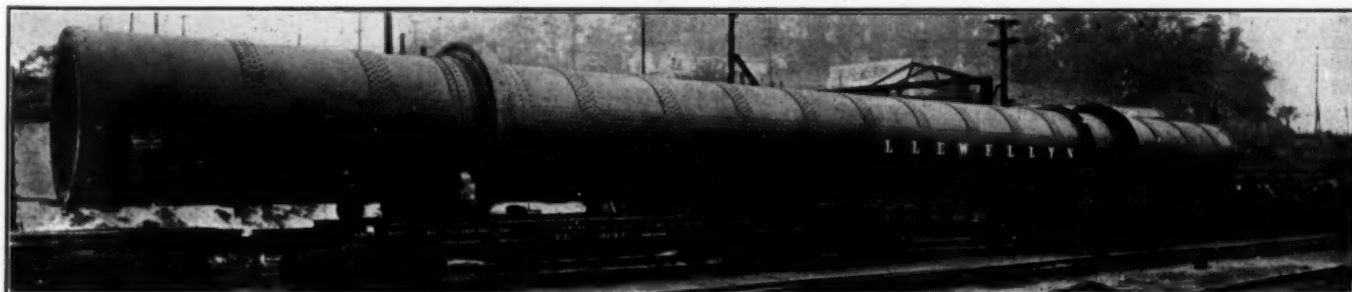
Charleston County, S. C., says the A. C. L. News, produces and ships more than 500,000 crates of early spring cabbage annually, valued at approximately \$1,000,000. In addition to shipments of cabbage, Charleston is the center of the cabbage plant industry which brings to the county about \$250,000 annually. Millions of plants are shipped to almost every section of the United States, and into Alaska and Canada. The "frost proof" variety, specialized in by South Carolina growers, has passed through Alaskan and Canadian winters without damage. About 20,000 acres are devoted to truck growing on the mainland and islands around Charleston.

Twin-City Brotherhoods Unite in Protest

Members of railway brotherhoods of Minneapolis, Minn., and St. Paul, organized, at a meeting in St. Paul on June 4, to protest bus line competition with railways in Minnesota. Representatives of all lodges of the Brotherhood of Railway Conductors and of express and station employees adopted a resolution asking regulation and control of the bus lines, declaring that they were in unfair competition with the railroads. E. W. Anderson, general chairman of the clerks' brotherhood of the Great Northern, was elected chairman of the organization and J. J. Kelly, general chairman for the express clerks, was made secretary. The extension of the organization to include all the 16 standard organizations of the railway employees will be considered at a meeting to be held June 15.

Southern Pacific Moves Large Kiln

A complete revolving kiln, 9 ft. in diameter and 125 ft. long, and weighing with machinery, 175 tons, was shipped recently from Los Angeles, Cal., to Lompoc, a distance of 182 miles, over the Southern Pacific. The kiln was made by the Llewellyn Iron Works, Los Angeles, for the Celite Products Company, Lompoc, and was made of three-quarter-inch plate throughout, with riding rings, driving gear and trunnion rollers of cast steel. It is to be used in burning kieselguhr or diatomaceous earth. The tube was loaded on two flat cars with a spacer car between, and the complete train consisted of a locomotive and caboose with six flat cars.



A Hundred-and-twenty-five-foot Kiln

Commission and Court News

Interstate Commerce Commission

Express Rates Revised

The Interstate Commerce Commission has issued an order affirming with certain modifications the findings made in its previous order in Express Rates, 1922, in which it proposed a general revision of express rates and cited the parties of record to show cause by March 1, why they should not be made effective. The rates are now made effective as of January 1, 1925. The commission again reviewed the cost study submitted by the Class I railroads in support of the petition for increased interstate express rates and charges filed by the American Railway Express Company and in support of the rail lines' claim of the need of additional revenues from express traffic, and finds that this study has not established the cost of the express service. The revision includes both increases and decreases in rates. The report says that there is abundant evidence that, with the constantly increasing number of other and cheaper transportation services available, the express service would only be jeopardized by increases such as were asked for by the express company.

Court News

Short Line Not Entitled to Compensation

The United States Court of Claims, in a decision rendered on May 19, held that the Marion & Rye Valley was not taken over by the government under the President's proclamation of December 26, 1917, or under subsequent orders of the Railroad Administration in such a way as to entitle it to compensation from the government. A board of referees appointed by the Interstate Commerce Commission had held that the road was under federal control for the first six months of 1918 and awarded \$14,425 as compensation for that period but the director general of railroads refused to pay it on the ground that the road had never been taken over and the road filed suit to recover the amount in the court of claims. After carefully reviewing a stipulation of the facts and the evidence relied on the court held that no taking is shown which comes within the meaning of the Constitution and the law and that "it follows that the plaintiff cannot recover. . . . There is no proof that it has lost anything thereby. Its property has never been out of its control. It operated it without let or hindrance by the government during the entire period for which it is claiming that the government had possession of it. . . . We think that the property of the plaintiff was not taken by the government. If there was technical control of the property by the government it was of such a character that it did not cause any loss to the plaintiff, and does not justify the award of any compensation."

United States Supreme Court

Land Grant Freight Rates on

Property Purchased by Government

In an appeal from the Court of Claims by the Illinois Central the question was whether in certain shipments of property for use by the United States in improvements of the Missouri River title to the property passed at the place of shipment or at the place of delivery. The company contended for the latter, although it rendered bills for and accepted payment of them on the other view, believing, it averred, that that view was correct, and that the shipments were the property of the United States. The action was brought for the difference, \$40,000. The Court of Claims decided against the railroad.

The railroad's contention was that the shipments were to be tested or inspected at or beyond destinations and accepted or rejected there. The Supreme Court holds, however, that the Government specially intended to avail itself of the fact that the shipments were to be transported over land-grant roads. The invitations for bids invariably ask for prices for the articles de-

livered f. o. b. cars at [place of shipment]. The successful bidder will procure the cars, but the United States will pay the freight and furnish bills of lading. This form of invitation was only used over land-grant or bond-aided roads, and was never used where delivery was to be made at point of use. Provisions for a final inspection at point of delivery or after the rendering of a further service by the contractor at that point were not inconsistent with a specific provision under which title passed to the United States by delivery at the initial point of shipment. . . . Land-grant rates were applicable."—Ill. Cent. v. U. S. Opinion by Justice McKenna. Decided May 26, 1924.

Liability for Live-Stock—Cummins Amendments

The effect of the first Cummins amendment (March 4, 1915, c. 176, 38 Stat. 1196, 1197) was to nullify provisions limiting liability. While it was in force, five out of a shipment of six horses from Latonia, Ky., to Windsor, Ontario, were killed in transit, and the shipper sued the carrier in the federal court, Middle District of Tennessee, recovering a verdict and judgment for \$25,000. This was affirmed by the Circuit Court of Appeals, Sixth Circuit, 286 Fed. 61. The case came before the United States Supreme Court on writ of error. The carrier contended that recovery should have been limited to \$500, the contract reciting that the value of the horses was declared by the shipper to be \$100 each. The horses were race horses and of much greater value; a fact known to the carrier's agent.

The Supreme Court holds that from the comprehensive terms of the 1915 amendment it appears to have been the intention of Congress "to make the carrier liable for the full actual loss, regardless of any agreement or representation of the shipper. Its purpose is so accurately stated that discussion could not make it clearer. The enactment of the second Cummins amendment, in the following year (Act of August 6, 1916, c. 301, 39 Stat. 441) indicates merely that the provisions of the 1915 act proved to be more comprehensive than were found to be desirable." The judgment was affirmed—Adams Express Co. v. Darden. Opinion by Justice Sanford. Decided May 26, 1924.

Note.—The 1916 Act permits limitation of liability on property, except ordinary livestock, concerning which the carrier shall have been expressly required by order of the Interstate Commerce Commission to establish rates dependent upon declared or agreed value.

Refrigerator Car Company Not Carrier by Railroad

On March 15, 1920, the Chicago, New York & Boston Refrigerator Company filed with the Interstate Commerce Commission its written acceptance of the provisions of section 209 of Transportation Act, 1920, by which the United States guaranteed to carriers, as defined in the section, certain income for six months after March 1, 1920, and it later applied for a certificate of the amount due, which the Commission denied on the ground that the company was not a carrier within the meaning of the Act. Mandamus to compel the Commission to comply with the section was denied by the Supreme Court of the District of Columbia. On appeal, the Court of Appeals affirmed this judgment, 288 Fed. 649. This judgment has, in turn, been affirmed by the Supreme Court of the United States.

"The Refrigerator Company is not incorporated as a carrier, does not control or use the necessary facilities for performing carriage, does not hold itself out to perform carriage by publishing rates applicable thereto, and does not in fact perform carriage or receive any compensation from shippers whose shipments move in its cars. The cars are rented to railroad companies, and are to all intents and purposes the railroads' property during the period of the lease. In a word, the Refrigerator Company carries nothing."

The Supreme Court says, in part: "The guaranty itself is in respect of railway operating income." The car company's income arises from the use of facilities let to the railway companies for fixed compensation. The cars were delivered to, and controlled in their use by the railroads."

"Section 209 of the act contains special provisions in respect of these express and sleeping car companies, which would have been entirely unnecessary if they had been carriers."

U. S. ex. rel. Chi., N. Y. & B. Ref. Co. v. I. C. C. Opinion by Justice Sutherland. Decided May 26, 1924.

Equipment and Supplies

Freight Cars

THE LOUISIANA & ARKANSAS is inquiring for one baggage and mail car.

THE GEORGIA & FLORIDA is negotiating for the rebuilding of 85, 40-ton box cars.

THE MISSOURI PACIFIC is inquiring for 1,000 40-ton auto box cars and for 1,500 refrigerator cars.

THE MEXICAN PETROLEUM COMPANY has ordered from the American Car & Foundry Co., 25 tank cars of 8,000 gal. capacity, for carrying gasoline.

THE NATIONAL RAILWAYS OF MEXICO are negotiating with car builders in this country for the purchase of about 3,500 freight cars, of various types, including narrow gage and standard gage.

Passenger Cars

THE TEMISKAMING & NORTHERN ONTARIO has ordered from the Railway Storage Battery Car Co., through its Montreal representatives, the International Equipment Company, Ltd., one 55 ft. combination passenger, smoking and baggage storage battery car. The car is to be equipped with Edison batteries, General Electric motors and control, and Westinghouse air brake equipment. This car is in addition to the order reported in the *Railway Age* of May 10.

Track Specialties

THE CHESAPEAKE & OHIO is inquiring for a small tonnage of rails, spikes and bolts.

THE NORTHERN PACIFIC has ordered 60,000 tie plates from the Illinois Steel Company.

Signaling

THE SOUTHERN PACIFIC has ordered from the Union Switch and Signal Company 40 Style "B" semaphore signals, 61 relays and other mechanism for use on the Coast Lines and five Style "B" signals with the necessary relays, etc., for the Houston & Texas Central.



Four Wheel Drive Motor Car in Operation on the Maryland & Delaware Coast Between Queenstown, Md., and Lewes, Del.

Supply Trade News

John C. Campbell has become associated with the Ulster Iron Works, at Dover, N. J., with headquarters at the Chicago office in the Peoples Gas building.

The Safety Car Heating & Lighting Company has removed its Chicago office from the Peoples Gas building to the new Straus building, 310 South Michigan avenue.

The Ramsey Chain Company, Inc., Albany, N. Y., has appointed the Morse Engineering Company, 549 West Washington street, Chicago, as the company's Chicago representatives.

Ernest S. Park, vice-president of the Century Wood Preserving Company, Pittsburgh, Pa., has also been made vice-president and general manager of the New England Wood Preserving Company with headquarters at Nashua, N. H.

Sidney G. Johnson, railway supplies, 30 Church street, New York City, has ceased activities on behalf of the Hazard Manufacturing Company's account covering insulated wires and cables. He will continue to represent the Signal Accessories Corporation of Utica, N. Y., and the Magnetic Signal Company of Los Angeles, Cal., besides dealing in other miscellaneous railway supplies.

The Ellcon Company, 50 Church street, New York, has taken over the representation of the Cleveland Varnish Company, Cleveland, Ohio, for the railway and marine field in the eastern section of the United States. R. H. Sheppard has been chosen as manager of this particular department. Mr. Sheppard has been associated in the past with other large paint and varnish companies in their railway trade.

Max Riebenack has been appointed district sales engineer in the Philadelphia branch office of the Industrial Works, Bay City, Mich. Mr. Riebenack was formerly mechanical and research engineer with the National Aniline Chemical Company and the Industrial Separators Company, Philadelphia. Ben W. Beyer, Jr., of New York, formerly sales engineer with the Union Special Machine Company, Chicago, is now with the New York branch office of the Industrial Works, as district sales engineer.

William C. Prendergast has been appointed district sales manager of the Tacony Steel Company, with headquarters at 2 Rector street, New York City. Mr. Prendergast was for 14 years active vice-president of the John C. Vance Iron & Steel Company, Chattanooga, Tenn., a connection which he resigned to become export manager of steel products for the Lucey Manufacturing Company. Subsequently, Mr. Prendergast was vice-president and general manager of the Vance Import & Export Company. He joined the Tacony Steel Company in November, 1923, as manager of the tool steel department, in which capacity, it is understood, he will continue in connection with his duties as New York district sales manager.

Trade Publications

PAINT.—A bulletin has been issued by the Eagle-Picher Lead Company, 208 South La Salle street, Chicago, setting forth the advantages of painting with sublimed blue lead, and furnishing specifications for its use. While the major portion of the bulletin is devoted to a consideration of blue lead, attention is also given to other products manufactured by the company, including paint pigment ground in oil and dry and metal products, numbering in all 24 varieties.

FIFTY CARLOADS AN HOUR is the unloading capacity for automobiles at the Fifty-second street freight station of the Pennsylvania Railroad, at Philadelphia, a new platform, 431 ft. long and 25 ft. wide having lately been added. New and old platforms together have space at which 34 box cars can stand. Lighting is provided to allow unloading at night. The enclosed space adjacent to the platforms has room for 500 automobiles. Loaded freight cars can be placed at the platforms within 45 minutes after their arrival in Philadelphia.

Railway Construction

ALABAMA & VICKSBURG.—reported in the *Railway Age* of May 31 as planning the construction of a freight and passenger station at Monroe, La., is not considering the immediate construction of a station at that point. Application has been made by the city for a new passenger station, but construction has not been authorized and no plans have been made.

ATCHISON, TOPEKA & SANTA FE.—This company closed bids on June 9 for the construction of two brick lavatory buildings at Arkansas City, Kan., to cost \$30,000.

ATCHISON, TOPEKA & SANTA FE.—This company will close bids on June 17 for the construction of a five-stall extension to its roundhouse at La Junta, Colo., at an estimated cost of \$50,000.

BALTIMORE & OHIO.—This company has awarded a contract to the Vaug Construction Company, Cumberland, Md., for the rebuilding of a masonry bridge at Guysville, O., at an approximate cost of \$70,000. A contract has been awarded to James F. McCabe & Company, Baltimore, Md., for the construction of a 30-ft. arch bridge at Arch and Barclay streets, Baltimore, at an approximate cost of \$35,000.

BALTIMORE & OHIO.—This company has awarded a contract to the Pittsburgh Construction Company, Pittsburgh, Pa., covering the erection of superstructures of new steel bridges at Dawson and Gratztown, Penna., on its main line, Pittsburgh division. The new structures consist of plate girder spans; maximum length 106 ft. Approximately 315 tons of steelwork is involved. The company has also awarded a contract to the Seaboard Construction Company, Philadelphia, covering the erection of a new 61-ft. plate girder span at Warren, O., Akron division; this structure contains about 62 tons of steelwork.

BOSTON & ALBANY.—This company has awarded a contract to the Adams & Ruxton Construction Company for the construction of locomotive pits at West Springfield, Mass.

CHICAGO, BURLINGTON & QUINCY.—This company, reported in the *Railway Age* of April 5 as closing bids for the construction of water treating plants at Keokuk, Ia., Akron, Colo., Ardmore, S. Dak., Clifton, Wyo., and La Grange, Mo., has rejected the old bids and is calling for new bids for the construction of water treating plants at these points.

MINNEAPOLIS & ST. LOUIS.—This company has awarded a contract to the Howlett Construction Company, Moline, Ill., for the construction of four automatic electric coaling stations of frame construction. These include one of 75 tons' capacity at Middle Grove, Ill., one of 75 tons' capacity at Grand Junction, Ia., and 200-ton coaling stations at Oskaloosa, Ia., and Albert Lea, Minn., respectively.

MISSOURI PACIFIC.—This company is calling for bids for the construction of a three-mile spur track at Benton, Ill., at an estimated cost of \$80,000.

READING.—This company has awarded a contract to C. H. Reimard & Son, Bloomsburg, Pa., covering grading and masonry required in connection with the reconstruction of a highway bridge east of Girardville, Pa.

READING.—This company has awarded a contract to the H. Denburger Contracting Company, Bethlehem, Pa., for grading and culvert masonry in connection with the relocation of tracks, the grading of the site for a new coaling station and approaches to a river bridge at Birdsboro, Pa.

SEABOARD AIR LINE.—This company has awarded a contract to the Cement Gun Company, Chicago, for alterations to its engine house at Abbeville, S. C.

SOUTHERN PACIFIC.—This company contemplates the construction of a freight and engine terminal, including yards, roundhouse and repair shops, at Klamath Falls, Ore. It is planned to make Klamath Falls the division point on the new line from Eugene.

Railway Financial News

BALTIMORE & OHIO.—Bonds.—This company has applied to the Interstate Commerce Commission for authority to do the things necessary and preliminary to the sale, and for the sale, of \$35,000,000 of refunding and general mortgage 6 per cent bonds, for refunding purposes, the issuance of part of which had already been authorized, to a syndicate composed of Kuhn, Loeb & Co., and Speyer & Co., at 96½ and interest.

The Interstate Commerce Commission has authorized the Baltimore & Ohio to issue \$5,570,000 of refunding and general mortgage 6 per cent bonds, to be pledged as collateral for notes, and subsidiaries to issue various bonds and deliver them upon order of the B. & O., to trustees under certain mortgages.

BALTIMORE, CHESAPEAKE & ATLANTIC.—Acquisition.—This company, a subsidiary of the Pennsylvania, has applied to the Interstate Commerce Commission for authority to acquire control of the Baltimore & Eastern by purchase of its capital stock, \$230,000, at par for cash, and the latter company has applied for authority to issue the stock and for a certificate authorizing it to acquire and operate a part of the former Maryland, Delaware & Virginia, from Love Point to Centreville, Md., about 40 miles, and a ferry service between Love Point and Baltimore.

BANGOR & AROOSTOOK.—Six Months Guaranty.—The Interstate Commerce Commission has certified the amount of this company's guaranty for the six months following the termination of federal control as \$332,580 of which \$11,419 was to be paid on the final certificate.

BUFFALO & SUSQUEHANNA.—Dividends.—The directors have failed to declare the usual extra quarterly dividend of 2½ per cent. The regular semi-annual dividend of 2 per cent on the preferred stock and the regular quarterly dividend of 1¾ per cent on the common have been declared. Both are payable June 30 to stock of record June 15.

CAPE GIRARDEAU NORTHERN.—Foreclosure Sale.—This road will be offered for sale at public auction on July 2 following an order issued by the Common Pleas Court of Missouri under foreclosure proceedings last February. The minimum price set for the road is \$750,000 and it may be sold either in part or as a whole. It has been in receivership for 10 years and has a book value of \$1,800,000 with 104.2 miles of track extending from Cape Girardeau, Mo., to Farmington, with a branch from Saline Junction to West Chester.

CHICAGO & ALTON.—Litigation Over Settlement With Railroad Administration.—The director general has instituted a suit in the United States Court of Claims for a decision as to the basis for a settlement of the amounts owed by the government to the railroad and by the railroad to the government for the period of federal control, involving the question of over or undermaintenance. A board of referees appointed by the Interstate Commerce Commission found that the Alton was entitled to compensation on the basis of the standard return at the rate of \$3,178,314 per annum but the director general has offsetting claims against the road on which there has been a failure to agree.

CHICAGO, MILWAUKEE & ST. PAUL.—Bonds.—The Interstate Commerce Commission has authorized an issue of \$3,370,000 of general mortgage 5 per cent gold bonds, to be pledged and repledged as collateral security for notes.

CHICAGO, ST. PAUL, MINNEAPOLIS & OMAHA.—Annual Report.—The annual report for the year ended December 31, 1923, issued this week, shows a net income before dividends of \$624,173, as compared with \$1,177,929 in 1922. A selection of the principal items in the income account follows:

| | 1923 | 1922 | Increase or decrease |
|-------------------------------------|--------------|--------------|-------------------------|
| Average mileage operated..... | 1,749 | 1,749 | |
| Freight revenue | \$20,074,017 | \$19,602,694 | \$471,323 |
| Passenger revenue | 6,110,999 | 6,110,337 | 661 |
| Total operating revenues..... | 28,363,234 | 27,801,007 | 562,227 |
| Maintenance of way and structures.. | 3,653,661 | 3,526,300 | 127,363 |
| Maintenance of equipment..... | 5,678,518 | 5,011,252 | 667,266 |
| Traffic | 421,396 | 409,486 | 11,911 |
| Transportation | 12,818,667 | 12,390,761 | 427,906 |

| | | | |
|---|------------|------------|-----------|
| General | 850,632 | 849,811 | 821 |
| Total operating expenses..... | 23,516,147 | 22,297,051 | 1,219,097 |
| Net revenue from railway operations | 4,847,087 | 5,503,956 | -656,869 |
| Railway tax accruals..... | 1,598,503 | 1,545,993 | 52,510 |
| Railway operating income..... | 3,236,381 | 3,944,933 | -708,552 |
| Net railway operating income..... | 3,028,915 | 3,812,671 | -783,756 |
| Total non-operating income..... | 237,706 | 247,107 | -9,401 |
| Gross income | 3,266,621 | 4,059,778 | -793,157 |
| Total deductions | 2,642,448 | 2,881,849 | -239,401 |
| Net income | 624,173 | 1,177,929 | -553,756 |
| Dividends: | | | |
| On preferred stock 7 per cent..... | 788,151 | 788,151 | ..... |
| On common stock 5 per cent in 1922, and 2½ per cent in 1923 | 463,918 | 927,835 | -463,918 |
| Total | 1,252,069 | 1,715,986 | -463,918 |
| Balance loss for the year..... | 627,896 | 538,057 | 89,838 |

Defers Preferred Dividend.—The directors of the Chicago, St. Paul, Minneapolis & Omaha have deferred action on the preferred dividend until a later meeting. The preferred stock has been paid regularly for more than 25 years. In February of this year the common dividend was passed.

CLEVELAND & PITTSBURGH.—*Stock.*—This company has applied to the Interstate Commerce Commission for authority to issue \$9,928,850 of special guaranteed betterment stock, to be guaranteed by the Pennsylvania.

EL PASO & SOUTHWESTERN.—*Acquisition by S. P.*—T. M. Schumacher, president of the El Paso & Southwestern, has issued the following statement:

"It is true that negotiations between the Southern Pacific and the El Paso & Southwestern looking toward the bringing of the two properties together have been practically completed. No formal contract has yet been executed between the parties and full details cannot therefore be yet furnished to the public. Of course, any such arrangement will have to be submitted to the Interstate Commerce Commission for its approval and authorization and such application will immediately follow the agreement now being negotiated. The negotiations include a substantial development of railway facilities in the southwest and particularly in Arizona."

GLENMORA & WESTERN.—*Abandonment.*—The Interstate Commerce Commission has issued a certificate authorizing the abandonment of this company's line from McNary to Holdup, La., 17 miles.

KALAMAZOO, LAKE SHORE & CHICAGO.—*Abandonment.*—The Interstate Commerce Commission has issued a certificate authorizing the abandonment of this company's line from Kalamazoo to Lawton, Mich., 16 miles.

KANSAS, OKLAHOMA & GULF.—*Receivership.*—H. W. Gibson, of Muskogee, Okla., has been appointed receiver by Federal Judge R. L. Williams on the petition of holders of first mortgage bonds. The Kansas, Oklahoma & Gulf operates between Joplin, Mo., and Denison, Tex., 325 miles.

MARYLAND & DELAWARE COAST.—*Authorized to Operate.*—The Interstate Commerce Commission has issued a certificate authorizing this company to operate a line from Denton, Md., to Lewes, Del., 40 miles, formerly owned by the Maryland, Delaware & Virginia.

MISSISSIPPI CENTRAL.—*Annual Report.*—The annual report for the year ended December 31, 1923, shows a net loss of \$6,297 as compared with a net loss of \$152,389 in 1922.

NEW ORLEANS, TEXAS & MEXICO.—*Argument.*—The Interstate Commerce Commission has set Finance Docket No. 3478, the application of the New Orleans, Texas & Mexico to acquire control of the International-Great Northern for further argument in connection with argument in Finance Docket No. 4049, the application of the Missouri Pacific to acquire control of the New Orleans, Texas & Mexico. The date for argument will be announced later.

NEW YORK, CHICAGO & ST. LOUIS.—*Bonds.*—An offering of \$26,058,000 refunding mortgage 5½ per cent gold bonds, series A, due April 1, 1974, is being made by a syndicate headed by the Guaranty Company of New York, Lee, Higginson & Co., Harris, Forbes & Co. and Dillon, Read & Co., at 94½ per cent and accrued interest, to yield about 5.84 per cent. The Interstate Commerce Commission has authorized the sale of these bonds and also the pledge of \$425,000 of Toledo, St. Louis & Western prior lien 3½ per cent bonds. The commission deferred action on the application to issue from time to time \$86,010,000 of refunding mortgage bonds.

NORTHERN PACIFIC.—*Annual Report.*—This company's annual report for the year ended December 31, 1923, is reviewed in an article on another page of this issue entitled "Northern Pacific

Suffers From Low Rate Level." See also excerpts from annual report on adjacent pages.

OKLAHOMA CITY-ADA-ATOKA.—*Lease.*—This company has applied to the Interstate Commerce Commission for authority to acquire control by lease of the line formerly owned by the Missouri-Kansas-Texas from Atoka to Coalgate, Okla.

PHILADELPHIA & READING.—*Annual Report.*—The annual report for the year ended December 31, 1923, shows a net income of \$16,908,865 as compared with \$7,896,552 in 1922. A selection of the principal items in the income account follows:

| | 1923 | 1922 |
|---|--------------|--------------|
| Freight—coal | \$44,205,359 | \$30,260,681 |
| Freight—merchandise | 44,853,834 | 37,202,330 |
| Passenger | 10,632,860 | 9,950,155 |
| Total railway operating revenue..... | 104,948,371 | 81,934,751 |
| Maintenance of way and structures..... | 10,698,098 | 8,679,417 |
| Maintenance of equipment..... | 25,116,306 | 19,591,117 |
| Traffic | 951,294 | 743,530 |
| Transportation | 37,977,992 | 31,113,637 |
| General expenses | 1,816,260 | 1,743,021 |
| Total railway operating expenses..... | 76,735,656 | 62,055,322 |
| Net revenue from railway operations..... | 28,212,715 | 19,879,429 |
| Railway tax accruals..... | 4,157,943 | 3,243,766 |
| Total operating income..... | 24,028,567 | 16,622,251 |
| Net railway operating income..... | 21,813,109 | 14,328,714 |
| Gross income | 22,836,478 | 13,775,563 |
| Deductions from gross income..... | 5,927,613 | 5,879,011 |
| Net income | 16,908,865 | 7,896,552 |
| Income applied to sinking and other reserve funds | 48,914 | 48,674 |
| Income appropriated for investment in physical property | 3,147,168 | 1,811,978 |
| Income balance transferred to profit and loss.. | 13,712,783 | 6,035,901 |

SOUTHERN PACIFIC.—*Acquisition.*—See El Paso & Southwestern.

TEXAS & PACIFIC.—*Notes.*—This company has applied to the Interstate Commerce Commission for authority to issue \$4,400,000 of notes to be delivered to the director general of railroads for the funding of additions and betterments, and also to pledge \$5,500,000 of general and refunding mortgage bonds as security for the notes.

TUSKEGEE RAILROAD.—*Sold.*—W. G. Mitchell, of Atlanta, Ga., has purchased this five-mile line which connects with the Western of Alabama at Chehaw, Ala.

ULSTER & DELAWARE.—*Annual Report.*—The annual report for the year ended December 31, 1923, shows a net corporate income of \$15,796 as compared with a net loss of \$112,570 in 1922.

Dividends Declared

Atlantic Coast Line.—\$1.75, quarterly, payable June 10 to holders of record May 29.
Canada Southern.—1½ per cent, semi-annually, payable August 1 to holders of record June 27.
Cincinnati Northern.—3 per cent, semi-annually, payable August 1 to holders of record, June 27.
Cleveland, Cincinnati, Chicago & St. Louis.—Common, 1¼ per cent, quarterly; preferred, 1¼ per cent, quarterly; both payable July 19 to holders of record June 27.
Detroit River Tunnel.—3 per cent, semi-annually, payable July 15 to holders of record July 8.
Illinois Central.—\$2.00, semi-annually, payable July 1 to holders of record June 11.
Mahoning Coal Railroad.—Common, \$10.00, quarterly, payable August 1 to holders of record July 15; preferred, \$1.25, quarterly, payable July 1 to holders of record June 23.
Michigan Central.—10 per cent, semi-annually, payable July 29 to holders of record June 27.
Mohawk Valley.—\$2.00, quarterly, payable July 1 to holders of record June 20.
New York Central.—1¼ per cent, quarterly, payable August 1 to holders of record June 27.
Northern Central.—4 per cent, semi-annually, payable July 15 to holders of record June 30.
Northern Pacific.—1¼ per cent, payable August 1 to holders of record June 30.
Norwich & Worcester.—2 per cent, payable July 1 to holders of record June 14.
Pere Marquette.—Common, 1 per cent, quarterly, payable July 1 to holders of record June 13. Prior preferred, 1¼ per cent, quarterly; five per cent preferred, 1¼ per cent, quarterly; both payable August 1 to holders of record July 15.
Pittsburgh & Lake Erie.—\$2.50, semi-annually, payable August 1 to holders of record July 15.
St. Louis, Rocky Mountain & Pacific.—Preferred, 1¼ per cent, quarterly, payable June 30 to holders of record June 16.
Western Pacific.—Preferred, \$1.50, quarterly, payable July 2.

Trend of Railway Stock and Bond Prices

| | Last June 10 | Last Week | Last Year |
|--|-----------------|--------------|--------------|
| Average price of 20 representative rail- way stocks | 65.08 | 64.22 | 65.63 |
| Average price of 20 representative rail- way bonds | 86.38 | 85.62 | 83.93 |

Annual Report

Twenty-seventh Annual Report of the Northern Pacific Railway Company

OFFICE OF THE
NORTHERN PACIFIC RAILWAY COMPANY,
ST. PAUL, MINNESOTA.

May 1, 1924.

To the Stockholders of the Northern Pacific Railway Company:

The following, being the twenty-seventh annual report, shows the result of the operation of your property for the year ending December 31, 1923:

| INCOME ACCOUNT. | | | |
|---|------------------|-----------------|-------------------------|
| | 1923 | 1922 | Increase or Decrease |
| Average mileage operated... | 6,668.99 | 6,640.64 | 28.35 |
| Operating Income. | | | |
| Operating revenues..... | \$102,002,059.86 | \$96,076,066.48 | \$5,925,993.38 |
| Operating expenses..... | 80,364,809.90 | 72,654,711.05 | 7,710,098.85 |
| Net operating revenue.... | \$21,637,249.96 | \$23,421,355.43 | —\$1,784,105.47 |
| Railway tax accruals..... | 8,462,890.56 | 8,430,583.11 | 32,307.45 |
| Uncollectible railway revenues | 19,428.60 | 24,982.54 | —5,553.94 |
| Railway operating income. | \$13,154,930.80 | \$14,965,789.78 | —\$1,810,858.98 |
| Equipment rents—net..... | 2,404,237.63 | 2,566,625.53 | —162,387.90 |
| Joint facility rent—net..... | 1,541,388.53 | 1,918,099.16 | —376,710.63 |
| Net railway operating income | \$17,100,556.96 | \$19,450,514.47 | —\$2,349,957.51 |
| Non-operating Income. | | | |
| Income from lease of road.. | 341,649.40 | 342,120.13 | —470.73 |
| Miscellaneous rent income.. | 716,274.96 | 638,982.68 | 77,292.28 |
| Miscellaneous non-operating physical property..... | 73,585.35 | 44,516.91 | 29,068.44 |
| Separately operated properties—profit | | 99,229.48 | —99,229.48 |
| Dividend income | 8,339,695.33 | 8,338,282.50 | 1,412.83 |
| Income from funded securities | 1,393,068.02 | 1,048,570.15 | 344,497.87 |
| Income from unfunded securities and accounts..... | 315,901.73 | 758,448.47 | —442,546.74 |
| Income from sinking and other reserve funds..... | 178.10 | 149.99 | 28.11 |
| Miscellaneous income | 1,322.94 | 1,429.13 | —106.19 |
| Total non-operating income. | \$11,181,675.83 | \$11,271,729.44 | —\$90,053.61 |
| Gross income..... | \$28,282,232.79 | \$30,722,243.91 | —\$2,440,011.12 |
| Deductions from Gross Income | | | |
| Rent for leased roads..... | \$51,320.66 | \$51,320.66 | ..... |
| Miscellaneous rents..... | 10,265.24 | 9,869.59 | \$395.65 |
| Interest on funded debt..... | 14,707,679.49 | 14,992,473.37 | —284,793.88 |
| Interest on unfunded debt.. | 258,855.43 | 67,646.14 | 191,209.29 |
| Amortization of discount on funded debt..... | 22,771.75 | 283,824.59 | —261,052.84 |
| Miscellaneous income charges | 249,914.34 | 260,180.06 | —10,265.72 |
| Total deductions from gross income | \$15,300,806.91 | \$15,665,314.41 | —\$364,507.50 |
| Net income..... | \$12,981,425.88 | \$15,056,929.50 | —\$2,075,503.62 |
| Dividend appropriations of income | 12,400,000.00 | 12,400,000.00 | ..... |
| Income balance for the year, transferred to profit and loss | \$581,425.88 | \$2,656,929.50 | —\$2,075,503.62 |

REVENUE TRAIN MILEAGE.

Revenue passenger train miles during the year were 9,753,631, an increase of 198,358 miles, or 2.08 per cent.
Revenue freight and mixed train miles during the year were 11,122,790, an increase of 885,696 miles, or 8.65 per cent.
Revenue special train miles during the year were 6,085, a decrease of 15,183 miles, or 71.39 per cent.
All revenue train miles during the year were 20,882,506, an increase of 1,068,871 train miles, or 5.39 per cent.

EARNINGS.

FREIGHT BUSINESS.

Freight revenue was \$77,610,569.96, an increase of \$5,885,564.22, or 8.21 per cent.
The number of tons of revenue freight carried was 24,133,001, an increase of 2,681,973, or 12.50 per cent.
6,854,336,779 tons of revenue freight were moved one mile, an increase of 833,177,807 tons one mile, or 13.84 per cent.
The average earnings per ton mile decreased from 1.191 cents to 1.132 cents.
The revenue train load increased from 588.17 to 616.24 tons. The total train load, including company freight, increased from 680.58 tons to 724.51.
The number of miles run by revenue freight trains was 10,471,764, an increase of 898,231, or 9.38 per cent.

PASSENGER BUSINESS.

Passenger revenue was \$15,438,784.11, a decrease of \$113,113.10, or .73 per cent.
Mail revenue was \$1,660,115.46, an increase of \$2,953.52 or .18 per cent.
Express revenue was \$2,059,449.07, a decrease of \$97,727.75, or 4.53 per cent.
Sleeping car, parlor and chair car, excess baggage and miscellaneous passenger revenue was \$1,075,201.80, an increase of \$54,325.80, or 5.32 per cent.

Total revenue from persons and property carried on passenger and special trains was \$20,233,550.44, a decrease of \$153,561.53, or .75 per cent.

The number of passengers carried was 4,706,528, a decrease of 556,912 from the previous year, and the number of passengers carried one mile was 479,515,131, an increase of 5,522,808, or 1.17 per cent.

The number of miles run by revenue passenger trains was 9,753,631, an increase of 198,358, or 2.08 per cent.

The average rate per passenger mile was 3.220 cents against 3.281 cents in 1922.

EARNINGS AND EXPENSES PER MILE OPERATED.

| | 1917 | 1920 | 1921 | 1922 | 1923 |
|--------------------------------------|-------------|-------------|-------------|-------------|-------------|
| Operating revenues per mile | \$13,526.37 | \$16,996.59 | \$14,199.10 | \$14,467.89 | \$15,294.98 |
| Operating expenses per mile | 8,171.39 | 15,177.88 | 11,659.73 | 10,940.92 | 12,050.52 |
| Net operating revenue per mile | 5,354.98 | 1,818.71 | 2,539.37 | 3,526.97 | 3,244.46 |
| Taxes per mile..... | 1,059.52 | 1,519.34 | 1,353.87 | 1,269.54 | 1,268.99 |
| Net | \$4,295.46 | \$299.37 | \$1,185.50 | \$2,257.43 | \$1,975.47 |

RATIOS.

| | 1917 | 1920 | 1921 | 1922 | 1923 |
|--|--------|--------|--------|--------|--------|
| Operating expenses to operating revenue | 60.41% | 89.30% | 82.12% | 75.62% | 78.79% |
| Transportation expenses to operating revenue | 32.34% | 42.84% | 37.87% | 38.31% | 37.78% |
| Taxes to operating revenue.. | 7.83% | 8.94% | 9.53% | 8.77% | 8.30% |

CONDUCTING TRANSPORTATION.

The charges for transportation expenses were \$38,535,417.42, an increase of \$1,733,789.41, or 4.71 per cent, as against an increase in total operating revenue of 6.17 per cent.

MAINTENANCE OF EQUIPMENT.

The charges for maintenance of equipment were \$22,464,341.74, an increase of \$4,399,726.35, or 24.36 per cent. Of this amount \$3,421,183.38 represents depreciation, accrued at the rate of 4 per cent.

LOCOMOTIVES.

| | |
|--|-------|
| Total number of locomotives on active list December 31, 1922, the date of the last annual report | 1,439 |
| Additions: | |
| Locomotives purchased | 49 |
| Locomotive remodeled | 1 |
| | 50 |
| Deductions: | |
| Locomotives sold during year, from active list..... | 5 |
| Locomotives withdrawn from service..... | 58 |
| | 63 |
| Total locomotives on active list December 31, 1923..... | 1,426 |
| In addition to the locomotives on active list there were: | |
| Withdrawn from service and on hand December 31, 1922..... | 27 |
| Withdrawn from service during the year..... | 58 |
| | 85 |
| Less—Dismantled during the year..... | 38 |
| Rebuilt and reinstated on active list..... | 1 |
| Sold | 1 |
| | 40 |
| Leaving on hand locomotives withdrawn from service which may be sold or dismantled | 45 |

PASSENGER EQUIPMENT

On December 31, 1923, the Company owned 1,146 passenger train cars, an increase of 34 cars, consisting of the purchase of 70 passenger refrigerator cars and one White gasoline car, and 4 cars transferred from miscellaneous equipment; less 36 cars destroyed or dismantled, and 5 cars transferred to miscellaneous equipment.

Authority has been given for the purchase during 1924 of ten all steel baggage cars.

FREIGHT CAR SITUATION ON DECEMBER 31ST.

| | 1923 | 1922 | Increase or Decrease |
|--|--------|--------|-------------------------|
| N. P. cars on line..... | 35,197 | 26,463 | 8,734 |
| Foreign cars on line..... | 11,544 | 10,337 | 1,207 |
| Total cars on line..... | 46,741 | 36,800 | 9,941 |
| N. P. cars on foreign lines..... | 11,791 | 20,259 | —8,468 |
| Number of cars unserviceable..... | 2,165 | 3,581 | —1,416 |
| Percentage of unserviceable to total cars on line. | 4.63 | 9.73 | —5.10 |
| Number of cars requiring heavy repairs..... | 1,530 | 1,860 | —330 |
| Percentage of total cars on line..... | 3.27 | 5.05 | —1.78 |
| Number of cars requiring light repairs..... | 635 | 1,721 | —1,086 |
| Percentage of total cars on line..... | 1.36 | 4.68 | —3.32 |

MAINTENANCE OF WAY AND STRUCTURES.

The charges for maintenance of way and structures were \$14,022,693.61, an increase of \$1,196,052.60, or 9.32 per cent. Because of the increasing weight of locomotives and cars the Company has adopted 100 pound rail as its standard for main line, and 130 pound rail for very heavy curves and mountain grades.

BRIDGES.

During the year 105 bridges were replaced, of which 51, 13,634 feet in length, were replaced by timber structures, and 2 permanent and 52 timber structures were replaced in permanent form as follows:

Replaced by embankment..... 47 bridges, 9,996 lineal feet.
Replaced by steel viaduct, plate girders,
I-beams and reinforced concrete trestles. 7 bridges, 1,371 lineal feet.

Total..... 54 bridges, 11,367 lineal feet.

In addition to changes referred to above, 4 temporary bridges were abandoned, 5 permanent and 13 temporary bridges were added; and 161 culverts were rebuilt, 23 in temporary and 138 in permanent form.

There are now under construction 498 lineal feet of steel truss for double track; 140 lineal feet of steel viaduct for single track; 544 lineal feet of girder and I-beam spans for double track and 136 lineal feet for single track; 36 lineal feet of reinforced concrete trestle for three tracks and 288 lineal feet for single track.

Bridges as they existed December 31, 1923.

| Description | No. | Lineal feet | Miles |
|--|-------|-------------|-------|
| Steel, iron, stone and concrete permanent bridges... | 802 | 145,216 | 27.50 |
| Timber and combination iron and timber structures.. | 2,536 | 380,832 | 72.13 |
| | 3,338 | 526,048 | 99.63 |

Total length of timber structures replaced by steel bridges, embankments or other permanent form from July 1, 1885, when the work was commenced, to December 31, 1923, 145.05 miles.

Buildings at Stations.

New buildings and structures or increased facilities have been provided at the following stations:

Wisconsin: Ashland.
Minnesota: Brainerd, St. Paul.
North Dakota: Dickinson, Jamestown.
Montana: Billings, Bozeman, Galen, Livingston, Miles City, Missoula.
Washington: Adco, Auburn, Cle Elum, Harrah, Kelso, Kent, Puyallup, Seattle, Tacoma, South Tacoma.

Water Supply.

New water station was constructed at Wilderness, Washington.

Fuel Stations.

A coaling platform was provided at Cosmopolis, Washington, and derrick and clam shell bucket with gas engine was installed at Hoquiam, Washington.

Roadway Buildings.

Section houses were provided at Iron River, Wisconsin; Barney, Crystal Springs, and McKenzie in North Dakota; Huson and West End in Montana, and at Maltby in Washington.

Signal maintainers' dwellings were erected at Eltopia and Gibbon, Washington.

Block Signals and Interlockers.

Automatic block signals were placed in service between Dilworth, Minnesota, and Burleigh, North Dakota, and between Cheney and Pasco, Washington. The main line is now automatically block signalled the entire distance from St. Paul to the Pacific coast.

The interlocking plants at Anglim and Buffington, Minnesota, have been completed and placed in service.

Line Changes.

Minnesota: Work on the line change around the Campus of the University of Minnesota at Minneapolis was continued during the year. The old line through the Campus has been abandoned and operation was started over the new line early in February, 1924. Track statistics incidental to the line change have been incorporated in this year's report.

In compliance with ordinance dated June 30, 1922, of the City Council of Minneapolis, providing for the elevation of the Northern Pacific tracks between Johnson Street and Lowry Avenue on Line B in Northeast Minneapolis, work was commenced at Central Avenue in 1923. The bridge carrying the railway tracks and all street work at Central Avenue was completed during the year, and the main tracks raised to permanent grade over the street with temporary approach grades. The grade separation will be extended westward over Eighteenth Avenue, Monroe Street and Nineteenth Avenue in 1924.

Montana: The line change between mile posts 156 and 157 on the Rocky Mountain Division near Phileman, Montana, was completed and placed in operation July 6, 1923.

Washington: A change of line was completed through the Tacoma Mill Company's property on the Point Defiance Line, eliminating the temporary alignment and single track in operation since the line was built, and providing double track in permanent location.

Miscellaneous.

The Rosebud Branch, extending from a connection with the main line about six miles west of Forsyth, Montana, thirty miles in a southerly direction up the valley of Armells Creek to the Rosebud coal fields was authorized, and grading and track laying were completed in December; ballasting will be started as soon as weather conditions permit, and it is expected that the construction will be completed about June 1, 1924. Work train service is now being maintained to the coal field.

The work of reconstructing bridge 565 over the Yellowstone River, near Billings, Montana, mentioned in last year's report, was completed and bridge placed in service August 1, 1923.

GENERAL.

Financial Results of Operation.

The operation of your property, after all charges, resulted in net income of \$12,981,425.88, a decrease of \$2,075,503.62. The volume of passenger business was 10.58 per cent less, and of freight business 12.50 per cent more than in 1922. The freight business measured in tons was exceeded only in one year, 1918, and then by less than 20,000 tons; it exceeded that of 1922 by 2,681,973 tons; but measured by ton miles it was less than any year during the period from 1916 to 1920, but exceeded that of 1921 and 1922.

Notwithstanding the large volume of freight moved in 1923, the revenue received for moving it did not increase proportionately. Much of the tonnage moved consisted of short-haul, low grade commodities, taking low rates; and the general rate level in the Northwest is too low considering the great increase in costs of every nature since the period before the war. The revenue per ton mile compared with the three years ended June 30, 1917, increased 43 per cent, while wages increased 113 per cent, fuel 77 per cent, and other material 73 per cent.

The operating revenues of the Company increased \$5,925,993.38, or 6.17 per cent, while operating expenses increased \$7,710,098.85, or 10.61 per cent.

The excess of increase in operating expenses over revenues is entirely due to heavier maintenance, especially maintenance of equipment. Net operating revenue decreased \$1,784,105.47, or 7.62 per cent.

| Year ending December 31, | Railway Property Investment Including Material and Supplies | Net Railway Operating Income | Return on Investment Per cent. |
|--------------------------|---|------------------------------|--------------------------------|
| 1916 | \$498,225,699 | \$33,446,012 | 6.71 |
| 1917 | 512,950,626 | 30,491,140 | 5.94 |
| 1918 | 526,323,059 | 24,217,342 | 4.60 |
| 1919 | 528,333,822 | 14,368,479 | 2.72 |
| 1920 | 540,259,557 | 7,949,458 | 1.47 |
| 1921 | 544,496,786 | 10,843,826 | 1.99 |
| 1922 | 550,332,639 | 19,450,515 | 3.53 |
| 1923 | 572,846,686 | 17,100,557 | 2.99 |

Claim Against the Government.

The Company's claim against the Government covering the guaranty period has not yet been adjusted. It is believed that final settlement will be made during the year 1924.

Valuation Work.

During the past year numerous conferences with representatives of the Bureau of Valuation of the Interstate Commerce Commission were held with reference to the preliminary engineering and land reports heretofore served upon the Company. It is thought that tentative valuation report will be received some time during the year 1924.

The number of Company employees engaged on this work at the end of 1923 was fifty, and the amount expended by the Company to that date in connection with the work was \$1,951,487.22.

Land Department.

While generally the crop conditions throughout the Company's territory in 1923 were fairly good, the grain prices were discouragingly low, so that little profit was realized from strictly grain growing operations. The sheep industry has been prosperous but the cattle business has not yet recovered from the depression. Financial conditions in North Dakota and Montana have grown increasingly difficult, culminating in the suspension of a number of banks, with a consequent crippling of business in the communities affected. The timber industry in Washington, Oregon and Idaho was prosperous throughout the year and a large quantity of stumpage was sold at very good prices.

The land market is still sluggish. There was less land sold in 1923 than in 1922, but the decrease is not so great as would appear from a comparison of the reports of the two years. The item reported in 1923 as new sales, aggregating 89,197.46 acres, is largely new business whereas the corresponding figure reported in 1922 contains a large number of resales. An exceedingly large number of land contracts were canceled during the year for abandonment and default. The deficit in the net proceeds is accounted for entirely by these cancellations. The cash receipts in 1923 were much in excess of those in 1922 so that, apart from the cancellations, the financial statement indicates a marked improvement over the previous year. There is a better outlook for increased land sales in 1924 than in any previous year since 1917.

Oil Development.

The Absaroka Oil Development Company proceeded with its drilling and exploration throughout the year. No discoveries of oil were made upon railway lands during the year, although, in addition to the Absaroka Company, a number of other Companies have been drilling in various localities under Absaroka permits.

Taxes.

The following statement shows taxes paid each year during the past four years:

| | 1920 | 1921 | 1922 | 1923 |
|---------------------------------------|----------------|----------------|----------------|----------------|
| State taxes | \$8,453,990.33 | \$8,339,049.60 | \$8,257,045.00 | \$7,748,214.88 |
| Federal taxes | 1,620,591.91 | 638,983.26 | 142,538.11 | 662,883.31 |
| Canadian and miscellaneous taxes..... | 34,104.14 | 36,087.64 | 31,000.00 | 51,792.37 |

Totals\$10,108,686.38 \$9,014,120.50 \$8,430,583.11 \$8,462,890.56

Comparative Statement of Payrolls.

A comparison of payrolls for a period of years ending December 31, follows:

| | |
|------------|-----------------|
| 1916 | \$28,204,669.00 |
| 1917 | 35,877,879.00 |
| 1918 | 49,632,127.00 |
| 1919 | 52,605,396.00 |
| 1920 | 66,503,794.00 |
| 1921 | 50,643,526.00 |
| 1922 | 49,041,401.00 |
| 1923 | 51,921,572.00 |

Security Owners and Employees.

There are now about 38,000 owners of stock and 30,000 owners of bonds of the Company.

As showing the number of small stockholders, the following figures are interesting:

21,002 hold from 1 to 19 shares.
12,047 hold from 20 to 99 shares.

33,049 or 86.99% hold less than 100 shares each.
4,942 hold 100 or more shares.

Total 37,991

13,966 of the stockholders are women.
2,559 are savings banks, insurance companies, trustees, guardians, colleges and charitable institutions.

The average number of employees in 1923 was 31,344.

Subsidiary Companies.

On page 44 will be found operating results of the Spokane, Portland and Seattle Railway Company together with its subsidiaries, the Oregon Trunk, Oregon Electric and United Railways, and on page 45 the operating results of the Minnesota and International Railway Company.

The United Railways Company acquired from the Oregon American Lumber Company the capital stock and property of the Portland, Astoria and Pacific Railroad Company and the facilities of the Nehalem Boom Company near Portland, and completed in 1922 the construction of the line of railroad to Keasey, Oregon, 32.6 miles. Effective January 1, 1924, these two railway properties were consolidated and are now operated as the United Railways.

Improvement in Freight Car Equipment.

During the war and the period of Federal control, freight car equipment was not maintained at the pre-war standard, and large expenditures have been required to rebuild and strengthen this equipment. On December 31, 1920, the Company had 48,729 freight cars, with a total capacity of 1,872,735 tons, and an average capacity of 38.43 tons. Since that date many old weak cars of small capacity have been dismantled. Many other cars have been rebuilt and new cars purchased, so that (counting cars ordered a year ago and just being received) the Company has 48,376 freight cars, with a total capacity of 1,914,625 tons, and an average capacity of 39.57 tons.

Improvement in freight car condition is indicated by the following tabulation:

| | Mar. 1, 1920 | Dec. 31, 1923 |
|---|--------------|---------------|
| Cars new or rebuilt within 5 years..... | 5,272 | 23,615 |
| Cars with steel centre sills..... | 18,860 | 21,429 |
| Cars with steel underframes..... | 8,124 | 13,216 |
| Cars with metal roofs..... | 19,094 | 26,645 |
| Cars with steel ends..... | | 4,000 |

Freight cars are now in better condition than at any time since 1917 and the same is true of passenger cars and locomotives. 714 locomotives are now equipped with superheaters, and 136 with mechanical stokers. The total tractive power of locomotives is 54,090,070 pounds, an average of 37,931 pounds. On December 31, 1917, the total tractive power was 46,467,200 pounds, an average of 34,142 pounds.

Erroneous Inclusion of Northern Pacific Lands Within the Boundaries of National Forests.

In consequence of the failure of the Government to survey the lands granted to the Northern Pacific in 1864 many of them were lost to settlers; and it was ascertained more than twenty-five years ago that the available lands within the "indemnity" limits of the grant were not sufficient to make up for these losses. Notwithstanding this fact the Government proceeded, against our protest, to include within the boundaries of National Forests a large quantity of Northern Pacific indemnity lands. The question of the right of the Government to do this having been submitted to the Courts, it was decided in favor of your Company by the Supreme Court of the United States on April 11, 1921.

The right of your Company to the lands in dispute would therefore seem to have been established; but at the instance of the Secretary of Agriculture, the President has asked Congress again to review the whole question of the administration of the grant for the purpose of ascertaining whether, in the adjustment of the numerous questions that have arisen during the past fifty years, some basis can be found for the retention of these lands by the Government. It is confidently believed that your Company's right to them cannot be successfully challenged.

Financial Condition.

In spite of the increase in funded debt occasioned by the refunding of the joint four per cent bonds in 1921 and in spite of the expenditure during the last seven years of \$67,311,059.48 for additions and betterments, your Company's funded debt has increased during that period only \$6,285,000. The total funded debt as of December 31, 1923, was \$319,849,500, on which the annual interest is \$14,799,430, or at the rate of 4.63 per cent. After applying the Burlington dividend to the payment of this interest there is left an annual charge of \$6,498,410, or less than \$1,000 a mile for the operated mileage, at an annual interest rate of 3.18 per cent. Exclusive of its two series of equipment trust notes which mature serially at the rate of \$450,000 each per annum up to the years 1930 and 1932, respectively, only \$2,930,500 par value of the Company's debt matures prior to the year 1996.

Under the provisions of the Refunding and Improvement Mortgage, a credit basis for the issue of approximately \$70,000,000 additional bonds is already established by expenditures for additions and betterments heretofore made and not capitalized, the retirement of prior debt refundable under the mortgage but against which no bonds have so far been issued, and on account of Burlington stock against which only a part of the bonds issuable therefor have been issued. This amount is sufficient to take care of the addition and betterment requirements of the property for a number of years.

By order of the Board of Directors,

Howard Ellicott,

Chairman.

Charles Donnelly,
President.

GENERAL BALANCE SHEET, DECEMBER 31, 1923.

| ASSETS. | | | Increase or Decrease | LIABILITIES. | | | Increase or Decrease |
|---|------------------|------------------|-------------------------|--|------------------|------------------|-------------------------|
| Investments. | 1923 | 1922 | | | 1923 | 1922 | |
| Road and Equipment. | | | | Stock. | | | |
| Road | \$449,127,706.43 | \$442,484,934.00 | \$6,642,772.43 | Capital stock—common... | \$248,000,000.00 | \$248,000,000.00 | ..... |
| Equipment | 105,637,516.89 | 90,686,035.77 | 14,951,481.12 | Governmental Grants. | | | |
| General | 3,372,228.80 | 3,316,144.70 | 56,084.10 | Grants in aid of construction | 80,714.05 | 21,193.73 | \$59,520.32 |
| | \$558,137,452.12 | \$536,487,114.47 | \$21,650,337.65 | Long Term Debt. | | | |
| Sinking Funds | | 22,501.47 | —22,501.47 | Funded debt | 329,176,500.00 | 328,206,900.00 | 969,600.00 |
| Deposits in lieu of mortgaged property (Net moneys in hands of Trustees from sale of land grant land, etc.).. | 440,542.66 | 788,519.97 | —347,977.31 | Less—held by or for the Company | 9,327,000.00 | 8,924,500.00 | 402,500.00 |
| Miscellaneous Physical Property | 8,661,252.95 | 7,919,152.27 | 742,100.68 | | \$319,849,500.00 | \$319,282,400.00 | \$567,100.00 |
| Investments in Affiliated Companies. | | | | Total Capital Liabilities. | \$567,930,214.05 | \$567,303,593.73 | \$626,620.32 |
| Stocks | 144,075,276.01 | 144,075,276.01 | ..... | Current Liabilities. | | | |
| Bonds | 30,203,797.75 | 31,065,697.75 | —861,900.00 | Traffic and car service balances payable..... | 1,402,362.58 | 808,986.82 | 593,375.76 |
| Notes | 2,392,899.35 | 2,388,699.35 | 4,200.00 | Audited vouchers and wages payable | 8,019,262.51 | 8,597,510.99 | —578,248.48 |
| Advances | 2,983,110.22 | 3,374,931.19 | —391,820.97 | Miscellaneous accounts payable | 488,489.04 | 606,304.58 | —117,815.54 |
| | \$179,655,083.33 | \$180,904,604.30 | —\$1,249,520.97 | Interest matured unpaid.. | 5,439,933.75 | 5,205,610.75 | 234,323.00 |
| Other Investments. | | | | Unmatured dividends declared | 3,100,000.00 | 3,100,000.00 | ..... |
| Stocks | \$1.00 | \$1.00 | ..... | Unmatured interest accrued | 396,702.08 | 546,417.66 | —149,715.58 |
| Bonds | 2,489,525.07 | 10,025,628.96 | —\$7,536,103.89 | Unmatured rents accrued. | 7,159.70 | 6,147.20 | 1,012.50 |
| U. S. Treasury certificates of indebtedness | | 1,000,078.12 | —1,000,078.12 | Other current liabilities.. | 172,305.36 | 203,957.52 | —31,652.16 |
| U. S. Treasury notes..... | 1,051,489.58 | 9,077,437.50 | —8,025,947.92 | Total Current Liabilities | \$19,026,215.02 | \$19,074,935.52 | —\$48,720.50 |
| Contracts for sale of land grant lands | 7,435,092.34 | 10,316,032.37 | —2,880,940.03 | Deferred Liabilities. | | | |
| | \$10,976,107.99 | \$30,419,177.95 | —\$19,443,069.96 | Due U. S. Government account various transactions | 55,471.04 | 133,291.16 | —77,820.12 |
| Total Capital Assets..... | \$757,870,439.05 | \$756,541,070.43 | \$1,329,368.62 | Other deferred liabilities.. | 267,607.65 | 177,096.18 | 90,511.47 |
| Current Assets. | | | | | \$323,078.69 | \$310,387.34 | \$12,691.35 |
| Cash | 10,374,362.29 | 10,325,432.12 | 48,930.17 | Unadjusted Credits. | | | |
| Time drafts and deposits.. | 1,378.00 | 1,000.00 | 378.00 | Tax liability..... | 7,270,563.60 | 6,213,052.20 | 1,057,511.40 |
| Special deposits..... | 5,532,505.55 | 9,661,166.55 | —4,128,661.00 | Operating reserves..... | 355,097.65 | 227,102.75 | 127,994.90 |
| Loans and bills receivable. | 855.30 | 1,005.30 | —150.00 | Accrued depreciation of equipment | 36,773,132.81 | 37,409,531.79 | —636,398.98 |
| Traffic and car service balances receivable..... | 1,874,994.93 | 1,980,614.72 | —105,619.79 | Other unadjusted credits. | 1,590,903.32 | 1,646,257.15 | —55,353.83 |
| Net balances receivable from agents and conductors.. | 996,664.35 | 1,117,733.25 | —121,068.90 | | \$45,989,697.38 | \$45,495,943.89 | \$493,753.49 |
| Miscellaneous accounts receivable | 4,594,509.12 | 5,180,779.48 | —586,270.36 | Corporate Surplus. | | | |
| Material and supplies..... | 14,709,233.81 | 13,845,525.11 | 863,708.70 | Additions to property through income and surplus | 379,612.49 | 293,541.04 | 86,071.45 |
| Interest, dividends and rents receivable | 82,907.86 | 318,857.40 | —235,949.54 | Funded debt retired through income and surplus.... | 16,092,739.04 | 15,705,056.54 | 387,682.50 |
| Other current assets..... | 119,867.71 | 153,440.52 | —33,572.81 | Miscellaneous fund reserves | 294,382.39 | 401,226.92 | —106,844.53 |
| Total Current Assets... | \$38,287,278.92 | \$42,585,554.45 | —\$4,298,275.53 | | \$16,766,733.92 | \$16,399,824.50 | \$366,909.42 |
| Deferred Assets. | | | | Profit and loss balance... | 156,541,308.62 | 159,554,434.85 | —3,013,126.23 |
| Working fund advances.. | 34,977.54 | 29,127.36 | 5,850.18 | Total Corporate Surplus | \$173,308,042.54 | \$175,954,259.35 | —\$2,646,216.81 |
| Due from U. S. Government account various transactions | 1,891.91 | 2,360.63 | —468.72 | | \$806,577,247.68 | \$808,139,119.83 | —\$1,561,872.15 |
| Other deferred assets..... | 14,467.86 | 25,160.29 | —10,692.43 | | | | |
| | \$51,337.31 | \$56,648.28 | —\$5,310.97 | | | | |
| Unadjusted Debits. | | | | | | | |
| Rents and insurance premiums paid in advance.. | 32,499.99 | 35,099.99 | —2,600.00 | | | | |
| Balance of Guaranty due from Government..... | 2,936,117.59 | 2,760,606.14 | 175,511.45 | | | | |
| Discount on funded debt.. | 2,394,492.29 | 2,000,573.75 | 393,918.54 | | | | |
| Other unadjusted debits.. | 5,005,082.53 | 4,159,566.79 | 845,515.74 | | | | |
| | \$10,368,192.40 | \$8,955,846.67 | \$1,412,345.73 | | | | |
| | \$806,577,247.68 | \$808,139,119.83 | —\$1,561,872.15 | | | | |

[ADVERTISEMENT]

Railway Officers

Executive

Frank M. Gould, assistant secretary of the St. Louis-Southwestern, with headquarters at New York, has been elected vice-president, with the same headquarters.

William H. Williams, chairman of the executive committee of the Missouri Pacific, has also been elected chairman of the board of directors, succeeding B. F. Bush, who has resigned.

C. E. Johnston, general manager of the Kansas City Southern, with headquarters at Kansas City, Mo., has been elected vice-president and general manager, with the same head-



C. E. Johnston

quarters, a newly created position. **A. M. Calhoun**, assistant to the president, with headquarters at Kansas City, has been elected vice-president and assistant to the president, with the same headquarters, also a newly created position. Mr. Johnston was born on October 30, 1881, at St. Elmo, Ill., and entered railway service in May, 1897, in the engineering department of the Chicago, Paducah & Memphis, now a part of the Chicago & Eastern Illinois. He was appointed assistant engineer on location, construction and maintenance on the St. Louis-San Francisco, in January, 1900, and held this position until February, 1903, when he was appointed resident engineer on location and construction on the Missouri Pacific. In June, 1903, Mr. Johnston was appointed assistant engineer maintenance of way of the St. Louis-San Francisco and in October, 1906, he entered the service of the Kansas City Southern as locating engineer. He was promoted to office engineer in August, 1908, and in June of the following year, was promoted to division engineer. Mr. Johnston was promoted to chief engineer in January, 1911, and he served in that capacity until February, 1917, when he was promoted to general manager. He remained in this position until his recent election as vice-president and general manager.

Robert T. Morrow, superintendent of the Pittsburgh division, Central region, of the Pennsylvania, with headquarters at Pittsburgh, Pa., has been promoted to assistant to the vice-president of the Central region, with the same headquarters.

Financial, Legal and Accounting

Emmet Trainor has been appointed general attorney for the Atchison Topeka & Santa Fe, with headquarters at Chicago.

E. A. Wigren, auditor of the Michigan Central, with headquarters at Detroit, Mich., has been given the title of general auditor and **R. R. Richards**, assistant auditor, has been given the title of assistant general auditor.

G. M. Glazier, auditor of the New York Central, with headquarters at New York, has been promoted to general auditor and the position of auditor has been abolished. **R. H. Sage** has been appointed assistant general auditor.

J. H. Pahlmann, auditor of disbursements of the St. Louis Southwestern, with headquarters at St. Louis, Mo., has been promoted to general auditor, with the same headquarters, suc-

ceeding **R. D. Cobb**, who has retired. **W. E. Harrington**, assistant auditor, with headquarters at St. Louis, has been promoted to auditor of disbursements, with the same headquarters, succeeding Mr. Pahlmann.

L. J. Hensley, auditor of the Kansas City Southern, with headquarters at Kansas City, Mo., has been promoted to comptroller, with the same headquarters, a newly created position. **G. H. Bacon**, assistant auditor, with headquarters at Kansas City, has been promoted to assistant comptroller, with the same headquarters. **W. G. Buechner**, freight and passenger accountant, has been promoted to auditor of revenues, with headquarters at Kansas City.

Operating

W. E. Lamb, whose promotion to superintendent of the Central division of the Missouri Pacific, with headquarters at Van Buren, Ark., was reported in the *Railway Age* of May 31, entered railway service in 1900 in the operating department of the Gulf & Ship Island. He later served in the operating departments of the Louisiana & Arkansas; the Vicksburg, Shreveport & Pacific and the Louisiana Railway & Navigation Company, and in 1906 entered the service of the Missouri Pacific at McGehee, Ark. Mr. Lamb was later promoted to chief dispatcher and subsequently to trainmaster, in which capacity he was successively transferred to various divisions. Mr. Lamb was trainmaster at Little Rock, Ark., at the time of his recent promotion to superintendent of the Central division.

J. L. Kendall, whose promotion to general superintendent of the Eastern district of the Missouri Pacific, was reported in the *Railway Age* of May 31, was born on January 10, 1881,



J. L. Kendall

at Washington, Ind. He entered railway service in November, 1895, as clerk and agent on the Evansville & Terre Haute. In 1898 he was appointed a telegrapher on the Pennsylvania and subsequently served as a telegrapher and a dispatcher on the Illinois Central, the Atchison, Topeka & Santa Fe, and the Wabash. Mr. Kendall entered the service of the Missouri Pacific as a train dispatcher in 1904 and two years later was promoted to trainmaster. He remained in this capacity until 1917

when he was promoted to assistant division superintendent and later to assistant to the general superintendent of transportation. He was promoted to superintendent of the Valley division in December, 1917, and in July, 1918, was transferred to the Memphis division. He was transferred to the Missouri division in December, 1922, and held this position until May, 1924, when he was transferred to the St. Louis terminals. Mr. Kendall held this position until June 1, when he was promoted to general superintendent of the Eastern district.

C. J. Foster, whose promotion to superintendent of the Southern division of the Chicago Great Western, with headquarters at Des Moines, Iowa, was reported in the *Railway Age* of May 24, was born on April 8, 1884, in Ogle county, Illinois. He entered railway service in July, 1900, as a stenographer in the operating department of the Mason City & Ft. Dodge, now a part of the Chicago Great Western. From March, 1901, to March, 1902, Mr. Foster served as a telegrapher for the Western Union Telegraph Company, returning to railway service in the latter year as a brakeman on the Minneapolis & St. Louis. He was promoted to station agent in September, 1902, and held this position until January, 1903, when he was appointed station agent on the Chicago, Rock Island & Pacific. Mr. Foster was promoted to car distributor

in January, 1904, and in July of that year, was promoted to chief dispatcher. Mr. Foster was appointed dispatcher on the Chicago Great Western in September, 1912, and continued in that position until July, 1917, when he was promoted to trainmaster. In June, 1923, he was promoted to acting division superintendent and he continued in that position until his recent promotion to superintendent.

William G. Barber has been appointed general manager of the Canadian National Telegraphs, to succeed the late George C. Jones. Mr. Barber was born in Toronto in 1872 and learned telegraphy in one of the Toronto branch offices. Later he entered the service of the Associated Press and was employed in New York, Washington and Buffalo. In 1907 he returned to Toronto and soon after became a traveling inspector for the C. N. T. Later he became superintendent of the Ontario division, and on January 1, 1920, he was made commercial superintendent. On January 2 of this year he was appointed general superintendent. **Charles E. Davies**, who has been acting general manager since the death of Mr. Jones, has been appointed assistant general manager, in charge of electrical engineering, plant and railway service.

J. H. Gumbes, general superintendent of the Western Pennsylvania division of the Pennsylvania, with headquarters at Pittsburgh, Pa., has been appointed special agent of the Eastern region, with headquarters at Philadelphia, Pa. **E. W. Smith**, general superintendent of motive power of the Southwestern region, with headquarters at St. Louis, Mo., has been appointed general superintendent of the Western Pennsylvania division, with headquarters at Pittsburgh, succeeding Mr. Gumbes. **J. H. Redding**, superintendent of the Eastern division, with headquarters at Pittsburgh, has been appointed superintendent of the Pittsburgh division, Western Pennsylvania division, with the same headquarters. **C. E. Whitlock**, superintendent of the Erie and Ashtabula division, with headquarters at New Castle, Pa., has been appointed superintendent of the Eastern division, with headquarters at Pittsburgh, succeeding Mr. Redding. **Norman B. Pitcairn**, engineer maintenance of way of the Northern division, with headquarters at Buffalo, N. Y., has been appointed superintendent of the Erie and Ashtabula division, with headquarters at New Castle, succeeding Mr. Whitlock. **J. A. Appleton**, freight trainmaster of the Philadelphia Terminal division, with headquarters at Philadelphia, has been appointed superintendent of the Monongahela division, with headquarters at Uniontown, Pa., succeeding A. W. McClellan, promoted.

Traffic

F. R. Kane has been appointed general agent, passenger department of the Western Pacific, with headquarters at Los Angeles, Cal.

J. W. Cloud has been appointed commercial agent for the Erie, with headquarters at St. Louis, Mo. **H. A. Bockman** has been appointed commercial agent, with headquarters at Kansas City, Mo.

E. F. Randall has been appointed general traffic agent of the Chicago, Peoria & St. Louis, with headquarters at East St. Louis, Ill., succeeding F. W. Brown, whose death on May 16 was reported in the *Railway Age* of May 24.

Mechanical

F. G. Grimshaw, superintendent of motive power of the Eastern Ohio division of the Pennsylvania, with headquarters at Pittsburgh, Pa., has been appointed general superintendent of motive power of the Southwestern region, with headquarters at St. Louis, Mo., succeeding E. W. Smith, promoted. **R. G. Bennett**, superintendent of motive power of the Central Pennsylvania division, with headquarters at Williamsport, Pa., has been transferred to the Eastern Ohio division, with headquarters at Pittsburgh, in the same capacity, succeeding Mr. Grimshaw. **E. B. De Vilbiss**, master mechanic of the Eastern division, with headquarters at Canton, Ohio, has been appointed superintendent of motive power of the Central Pennsylvania division, with headquarters at Williamsport, succeeding Mr. Bennett. **J. A. Sheedy**, assistant master mechanic of the Meadow shops, with headquarters at Jersey City, N. J.,

has been appointed master mechanic of the Eastern division, with headquarters at Canton, succeeding Mr. De Vilbiss.

Engineering, Maintenance of Way and Signaling

A. W. McClellan, superintendent of the Monongahela division of the Pennsylvania, with headquarters at Uniontown, Pa., has been appointed engineer maintenance of way of the Northern division, with headquarters at Buffalo, N. Y., succeeding N. B. Pitcairn, promoted.

Special

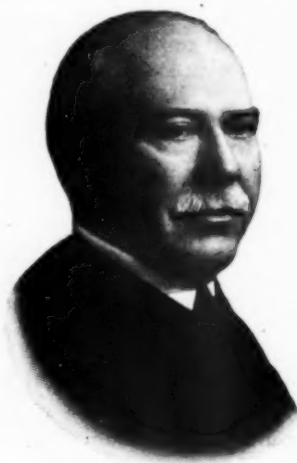
Arthur Hesketh has been appointed superintendent of investigation of the Western region of the Canadian National with headquarters at Winnipeg.

Obituary

James F. Fahnestock, treasurer of the Pennsylvania and Long Island, with headquarters at Philadelphia, Pa., died on June 8 in a local hospital of that city. Mr. Fahnestock was born on October 16, 1859, at Gettysburg, Pa., and entered the service of the Pennsylvania on December 9, 1908, as assistant treasurer, and in March of the following year he was appointed treasurer.

William H. Lewis, formerly superintendent of motive power of the Norfolk & Western, who retired from active service in November, 1918, died in Chicago on June 4. Mr. Lewis was born on October 18, 1845, at Syracuse, N. Y., and entered railway service in 1861 as a machinist apprentice on the New York Central. He was employed on the Chicago, Burlington & Quincy as a machinist in 1864, and in 1869 was promoted to locomotive engineer. Mr. Lewis was appointed general master mechanic on the Northern Pacific in 1873, and he held that position until 1878, when he was appointed division foreman on the Kansas Pacific, now a part of the Union Pacific. He was appointed master mechanic on the Oregon Short Line in 1882, and two years later was appointed master mechanic on the New York, Chicago & St. Louis. In 1888 Mr. Lewis was appointed master mechanic on the Chicago, Burlington & Northern, now a part of the Chicago, Burlington & Quincy, and he held this position until July 1, 1897, when he was appointed superintendent of motive power of the Norfolk & Western. He remained in that position until his retirement in 1918.

Oliver M. Spencer, general counsel of the Chicago, Burlington & Quincy, with headquarters in Chicago, died in that city on June 5. Mr. Spencer was born in Buchanan county, Missouri, on August 23, 1849, and graduated from Christian University at Canton, Mo., in 1873. During the next two years he attended the Harvard Law School, from which he received the degree of Bachelor of Laws. Mr. Spencer began practice in the legal profession at St. Joseph, Mo., in 1875, and in 1880, was elected prosecuting attorney. In 1887, he was elected judge of the circuit court and he held that office until 1891 when he entered railway service as general solicitor of the Missouri district of the Chicago, Burlington & Quincy, with headquarters at St. Joseph, Mo. Mr. Spencer continued in that position until April, 1917, when he was promoted to general counsel of the entire system, with headquarters at Chicago. He continued to serve in that capacity until the time of his death. Among other things he was active for years in trying to promote fair railway regulation, and it was largely due to his efforts that the Missouri full crew law was repealed in 1914 by an overwhelming referendum vote of the people.



O. M. Spencer